Vol. VIII September 1913 No. 3

The Stout Institute Bulletin

Twelfth School Year
1914-1915

Published Quarterly
at
Menomonie, Wisconsin

Entered as second-class matter November 20, 1908, at the post office at Menomonie, Wis., under the act of July 16, 1894

THE STOUT INSTITUTE BULLETIN

ANNOUNCEMENT
1914-1915

BEGINNING OF NEW "BUILDING TRADES" SCHOOL FOR THE MANUAL TRAINING DEPARTMENT

Vol. VIII September 1913 No. 3

THE STOUT INSTITUTE BULLETIN

OFFICERS AND FACULTY
GENERAL INFORMATION FOR 1914-15
THE MANUAL TRAINING DEPARTMENT
HOME ECONOMICS DEPARTMENT
THE HOMEMAKERS SCHOOL
THE TRADES SCHOOL
SUMMER SESSION

PUBLISHED QUARTERLY BY THE STOUT INSTITUTE
AT MENOMONIE, WISCONSIN

THE STOUT INSTITUTE

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THE STOUT INSTITUTE BULLETIN

The Bulletin is issued four times during the year: —March-June-September-December.

It covers the application of the principles of industrial and household arts and sciences to public school conditions and indicates how these subjects are being developed in Menomonie.

The subscription price is fifty cents per year. Sample copies will be sent upon request.

CALENDAR FOR 1914

Eleventh Regular Session begins September 8, 1913
Holiday vacation – December 20, 1913-January 5, 1914
First Semester ends January 23, 1914
Second Semester begins January 26, 1914
Spring vacation—March 28, 1914—April 5, 1914
Eleventh Regular Session ends June 5, 1914

Ninth Annual Summer Session begins July 27, 1914
Summer Session ends August 28, 1914

Twelfth Regular Session begins September 7, 1914
Twelfth Regular Session ends June 4, 1915

ANNOUNCEMENT

FOR THE TWELFTH ANNUAL SESSION OF

THE STOUT INSTITUTE

MENOMONIE, WISCONSIN

1914-1915

OFFICERS OF ADMINISTRATION

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FACULTY

INSTRUCTORS FOR THE SCHOOL YEAR

L. D. Harvey, Psychology and Pedagogy
Milton College, B. A., 1872; Ph. D., 1898. High school principal, 1873-1879; city superintendent, 1880-1885; normal schools, 1885-1898; state superintendent, 1889-1902; superintendent Stout Training Schools, 1903-1908; president Stout Institute, 1908-

George Fred Buxton, Organization of Manual Training, Drawing and Design
Pratt Institute, 1899; Teachers College, Columbia University, bachelor's diploma in education, 1904; B. S., 1908; University of Wisconsin, summer session, 1908, Teacher of manual training, Newark, New Jersey, 1899-1901; Portland, Maine, 1901, 1903; Springfield, Massachussetts, 1904-1905; Ohio State University, summers, 1909-1910; director manual training department, Stout Training Schools, 1905-1908; Stout Institute, 1908-

F. F. Hillix, Machine Shop Practice, Foundry Work
Purdue University, 1904-1905; special student and instructor, Purdue university, 1905-1910. Eight years practical experience in the metal trades. Instructor machine shop practice, Evansville, Ind., manual training school, 1910-1911; instructor foundry practice, Chicago University, summer session, 1911; Stout Institute, 1911-

Louis F. Olson, Carpentry, Architectural Drawing
Stout Institute, 1906; graduate work Stout Institute, 1907. Three years practical drafting, carpentry, and contracting; teacher of forging and mechanical drawing, Stout Institute, 1907-1908; director of manual training, public schools, Madison, Wis., 1908-1911; teacher of drafting and shop work, summer sessions, Kansas State Manual Training Normal School, 1909; Stout Institute, 1907, 1910, 1911; Stout Institute, 1911-

R. H. Chandler, Joinery, Pattern Making, Machine Drafting
Apprentice Cushman Electric Co., Concord, N. H., 1905-1908; pattern maker Amoskeag Manufacturing Co., Manchester N. H.; specialist in pattern making, Blake & Knowles, Steam Pump Works, Boston, Mass., 1909; job shop pattern making, 1910-1911; instructor in manual training, West Virginia University, 1911-1912; student Bradley Polytechnic Institute summer session, 1913; Stout Institute, 1912-

Fred L. Curran, Elementary Woodwork, Upper Grade Woodwork
State Normal School, Stevens Point, Wis., 1905; Stout Institute, 1908; Bradley Polytechnic Institute, summers, 1908, 1909. Teacher in public schools, 1898-1903; principal state graded schools, 1905-1907; Stout Institute, 1908-

H. M. Hansen, Cabinet Making, Mill Work, Saw Filing
Fourteen years' experience in mill work and as pattern maker, carpenter and draftsman; Stout Institute, 1912-

R. F. Jarvis, Blacksmithing, Industrial Economics
Shop work, 1905; University of Missouri, B. S., 1912. Assistant in engineering shop work, University of Missouri, 1906; instructor manual training, Birmingham, Ala., 1907-1911; assistant in manual training, University of Missouri, 1911-1912; Stout Institute, 1912-

A. H. Brown, Wood Finishing
Ten years' experience as journeyman painter and decorator; ten years' experience in wood finishing in piano factory, automobile and carriage shops. Stout Institute, 1911-

Henry O. Grubert, Wood Turning
Served apprenticeship in German wood turning shops; fifteen years' experience in all grades of wood turning; six years' experience in turning hard rubber, bone, ivory, and amber; five years' experience as shop manager. Stout Institute, 1913-

Chas. E. Eslinger, Printing, Primary Handwork
Stout Institute, 1912. Four years' experience as practical printer; teacher of printing and primary handwork, Stout Institute, 1912-

H. W. Jimerson, Plumbing and Gas Fitting
Journeyman and contractor, 1884-1904; director Minneapolis School of Plumbing, 1904-1908; director plumbing trade school, Stout Institute, 1908-

Wm. T. Gohn, Bricklaying, Cement Work
Williamson School of Trades, 1907-1910. Journeyman bricklayer. 1910-1911; director bricklaying trade school, Stout Institute, 1911-

J. O. Steendahl, Mechanical Drawing
Stout Institute, 1905. Director manual training, La Junta, Colorado, 1905-1906; The Academy of Idaho, Pocatello, Idaho, 1906-1910; head of drafting department, Portland School of Trades, Portland, Oregon, 1910-1912; Stout Institute, 1912-

Otto E. Brunkow, Architectural Drawing, Freehand Drawing and Design
University of Illinois, architecture, 1911-1912; Stout Institute, 1913. Four years practical experience in carpentry and architectural drawing; Stout Institute, 1913-

O. C. Mauthe, Physical Training
Normal School of North American Gymnastic Union, Milwaukee, 1895; Harvard University summer school of physical training, 1897; Chautauqua, N. Y., summer school, 1899; Gilbert Normal School of aesthetics and social dancing, Boston, summer, 1904. Physical director, Turnverein Vorwaerts, Milwaukee, 1895-1896; West Minneapolis Turnverein, Minneapolis, 1895-1899; special instructor, Harvard University, summers, 1898, 1902, 1903; physical director, Dayton Turngemeinde, and Young Women's League, Dayton, O., 1899-1903; physical director, Shreveport Athletic Association, Shreveport, La., 1903-1909; supervisor of games, Dayton vacation schools, 1903; supervisor of playgrounds, Shreveport, La., 1905-1909; physical director, Stout Institute, 1909-

Daisy Alice Kugel, Organization of Home Economics
University of Michigan, A. B. 1900; Columbia University, B. S. and diploma Teachers College, 1908; Teacher in public schools, 1902-1906; teacher of Domestic Science, Chautauqua, N. Y., summer 1911; Stout Institute, 1909-

Clara Louise Boughton, Advanced Cookery, Food Study
State Normal School, Milwaukee, 1890-1893; Stout Institute, 1909-1910. Teacher in public schools, Manitowoc, 1893-1909; director domestic science, Racine, 1910-1911; Stout Institute, 1911-

Lucy Cordiner, Dietetics, Food Study
State Normal School, Winona, 1893; University of Wyoming, A. B., 1905; graduate student, University of Chicago, 1907-1908, and summer session, 1911. Teacher public schools, Laramie, Wyoming, 1893-1902; critic teacher, Central normal school, Edmund, Oklahoma, 1902-1904; supervisor domestic science, Ishpeming, Michigan, 1908-1912; Stout Institute, 1912-

Bertha Bisbey, Dietetics, Advanced Cookery
Kansas State Normal, 1893-1894; University of Chicago, summer session, 1908; Stout Institute, 1910-1912. Teacher public schools, Alma, Kan., 1900-1903; Manhattan, Kan., 1903-1908; teacher of mathematics, Kansas State Agricultural College, Manhattan, Kan.; Stout Institute, 1912-

Jennie A. Humphrey, Junior Cookery

Michigan State Agricultural College, 1902-3; Teachers College, Columbia University, 1908. Teacher of domestic science, State Industrial School for Girls, Adrian, Mich., 1903; assistant in domestic art, Winthrop College, Rock Hill, S. C., 1908-1909; assistant in domestic science, Kansas State Agricultural College, Manhattan, Kan., 1910-1912; Stout Institute, 1912-

Clara G. Turner, Household Management, Junior Cookery,

Normal School, Fredricton, N. B., 1902; Mt. Allison Ladies' College, N. B., 1906; Teachers College, Columbia University, B. S., 1912. Teacher in public schools, New Brunswick, 1903-1904; teacher of domestic science, consolidated schools, New Brunswick, 1906-1911; Stout Institute, 1912-

Lenna G. Baker, Physiology, Home Nursing

State Normal School, Whitewater, 1907; Stout Institute, 1910. Teacher in public schools, 1907-1909; teacher. domestic science, high school, Everett, Washington, 1910-1911; Stout Institute, 1912-

Louise Phillips Glanton, Supervision of Practice Teaching

Harlie College, Rome, Ga., A. B.; Columbia University, B. S., and diploma Teachers College. Critic, third grade, Speyer school, Teachers College, 1902-1908; superintendent Nassau industrial school, Lawrence, Long Island, 1909-1910; director domestic science department, public schools, Montgomery, Ala, 1910-1912; Stout Institute, 1912-

Ruth Virginia Simpson, Junior Cookery

Illinois State Normal University, 1908-1910; summer sessions, 1906, 1907, 1908, 1909; Teachers College, Columbia University, 1911-12. Teacher in public schools, LeRoy, Illinois, 1905-1908; teacher of domestic science, high school, LeRoy, Illinois, 1910-1911; high school, Lead, South Dakota, 1912-1913; Stout Institute, 1913-

Mary M. McCalmont, Chemistry

West Minister College, New Wilmington, Pa., graduate student, University of Omaha, Neb., 1911; University of Wisconsin, 1911-1912. Teacher in public schools, 1906, 1907; principal of high school and supervisor of music, Woodville, Ohio, 1907-1909; city schools, Omaha, Neb., 1909-1911; Stout Institute, 1912-

Louise Williams, Microbiology

McGill University 1907; B. A. and diploma from McGill Normal school. Columbia university M. A. 1911, and master's diploma in the teaching of Biological Science, Teachers' College, 1911. Teacher of classics and science Dunham College, Quebec, 1907-1909; Stout Institute, 1911-

Muriel Speller, Textiles, Model Sewing, Dressmaking

Pratt Institute, 1903-1905; diploma in domestic art, Teachers College, Columbia Univsrsity, 1907; B. S., 1911; teacher, Macdonald Institute, Guelph, Ont., 1905-1906; Technical high school, Springfield, Massachussetts, 1907-1910; Stout Institute, 1911-

Grace M. Dow, Model Sewing

St. Paul Teachers' Training School, 1897; University of Minn., summer session, 1910; Stout Institute, 1911. Teacher in public schools, St. Paul, 1897-1898; Stout Institute, 1911-

Elizabeth A. Lathrop, Dressmaking, Primary Handwork

Boston School of Domestic Science, 1905; Teachers College, Columbia University, 1910. Teacher of domestic art, Atlanta University, Atlanta, Georgia, 1905-1908; Stout Institute, 1910-

Anna McMillan, Dressmaking, Plain Sewing

Stevens Point Normal, 1899; Stout Institute, 1908. Grade teacher, 1899-1905; teacher of domestic science, Stevens Point Normal School and Grand Rapids, Wis., public schools, 1908; Stout Institute, 1909-

Blanche W. Stevens, Trade Dressmaking

Domestic art, Minnesota State University, summer session, 1906; academic, Hamline University, 1907-1910; Stout Institute, 1910-1912; domestic art, Teachers College, summer session, 1912. Teacher in domestic art, Bethel Industrial School, 1906-1907; trade experience in Twin Cities, 1902-1907; Stout Institute, 1912-

Ella G. McCauley, Millinery, Art Needlework

Student Stout Institute, Summer Session, 1911, regular session, 1911-1912. Ten years experience as designer and trimmer in wholesale millinery establishments; instructor in millinery, Stout Institute, 1911-

Josephine W. Hobbs, Plain Sewing, Junior and Advanced Cookery and Marketing

Cook County, Illinois, normal school, 1897; Boston School of Domestic Science, 1907. Teacher in public schools, Dubuque, 1898-1906; supervisor domestic science and matron Moore Street Neighborhood House, Cambridge, Massachussetts, 1907-1908; superintendent, Y. W. C. A., Training School for Household Service, Boston, 1908, 1909; director, Homemakers School, Stout Institute, 1909-

Grace R. Darling, Home and Social Economics

University of Michigan, 1884; Teachers College Columbia University, 1892; Wisconsin Library School, Madison, Wisconsin, 1907. Teacher of history and literature, State Normal School, Oshkosh, Wisconsin, 1884-1891; teacher of history and literature, State Normal School, Milwaukee, Wisconsin, 1895-1903; Stout Institute, 1908-

Ruth Mary Phillips, English

University of Wisconsin, B. A., 1904; graduate work, University of Wisconsin, summer session, 1905, and one semester, 1909. Teacher in high school, Lodi, Wisconsin, 1904-1905; teacher in high school, Black River Falls, Wisconsin, 1906-1910; Stout Institute and Menomonie high school, 1910-

Mary I. McFadden, Psychology

State normal school, Oshkosh, 1897; University of Wisconsin, Ph. B., 1900; A. M., 1907; University of Chicago, Ph. M., 1901; Teachers College, Columbia University, January 1908-June 1908. Teacher, Grand Rapids high school, 1891-1892; principal, Menomonee Falls high school, 1892-1893; assistant principal, Oconto high school, 1893-1895; associate supervisor of practice, Oshkosh normal school, 1901-1906; acting assistant professor of education, University of Kansas, one semester, 1906-1907; principal Muskegon City normal school, 1908-1910; supervisor of practice, teacher of pedagogy and music, Sauk County Training school, 1911-1912; Stout Institute 1912-

Gladys T. Harvey, Interior Decoration

University of Wisconsin 1905-1906: Art Institute of Chicago 1906-1908; Stout Instiute Summer Sessions 1908, 1911, 1912. Handicraft School of Design and Normal Art, Minneapolis, 1910-1912; Stout Institute, 1913-

Mary L. Niles, Freehand Drawing and Design

Chicago Art Institute, 1902; student Minneapolis Handicraft Guild, 1908, and summers, 1907, 1908, 1909, 1910, 1911; student Prang summer school, Chicago, 1912; private student under John H. Vanderpool and Chas. Francis Brown, 1901. Teacher of private art classes, 1892-1909, teacher of clay modeling and pottery, Stout Institute, summer sessions, 1909-1913, regular session, 1913-

Alma Krueger, Physical Training

Normal college, North American Gymnastic Union, Indianapolis, Ind., 1911; Director play ground work Minneapolis, summers, 1912, 1913; Stout Institute, 1911-

GENERAL INFORMATION

ADMISSION, COURSES, EXPENSES, DATES

LENGTH OF COURSE

Courses leading to the diploma granted by each of the training schools for teachers require two years' work. No diploma is issued to any person who has not been a student in residence for at least one year. Upon the completion of one of these courses,—Manual Training or Home Economics.—a diploma is issued, which by statute, is made the basis for the issuance of a life certificate, after two years' successful teaching in Wisconsin.

This certificate legally qualifies the holder to teach the subjects in which training has been taken, in the public schools of the state. The certificate is issued by the Wisconsin State Board of examiners and is accepted in most of the other states.

QUALIFICATIONS FOR ADMISSION

Graduation from a four year's high school course, or equivalent preparation, is required for admission to each of the training courses. The candidate must be at least eighteen years of age, and must be possessed of good health and physical energy, of refinement and good character. Testimonials of good character are required.

Students who have had normal or collegiate training are given credit for such of the required work in the Institute courses as they have satisfactorily mastered. Successful experience in teaching before entering Stout Institute, in most cases, reduces the amount of practice teaching required of the student.

ADVANCE ENROLLMENT

School accomodations limit the number of students who can be enrolled; for this reason persons who wish to enter should make application in advance for an enrollment blank, which should be filled out and forwarded to the school with two certificates of good character. A physician's certificate of good health and physical ability to carry on full work in the Institute, must be presented by each student when first entering the school. Enrollment is made in the order of application.

THE DEMAND FOR GRADUATES

The demand for graduates of Stout Institute as teachers of manual training and home economics is steadily increasing year by year. At the present time they are teaching or doing supervisory work in twenty-seven states and in Canada.

The number of schools in which manual training and domestic art and science are being taught is rapidly increasing and the demand for well trained teachers of these subjects is greater than ever before.

The officers of the Institute are glad to recommend teachers to school officials who are seeking competent teachers of manual training and domestic

art and science. In making recommendations every effort is made to name candidates who by training, temperament, personality, and experience are adapted to the demands of the position to be filled. The more complete and definite the information furnished as to the kind and amount of work required, and the salary to be paid, the better they are prepared to select the person most likely to give satisfactory service. They prefer to make no recommendation unless they feel confident that they can name a candidate who will succeed.

While the officers of the Institute never guarantee positions to students upon graduation, they do everything in their power to assist graduates to positions they are qualified to fill.

THE SUMMER SESSION

Stout Institute Summer Sessions offer exceptional opportunities for supervisors or special teachers of manual training, domestic art and science, or freehand drawing to advance themselves along their special lines, either in technique or along the professional side. Superintendents and principals are finding in these summer sessions an opportunity for learning something of the content and method of school handwork. Grade teachers are perfecting themselves in special subjects through summer courses.

Provision is made for outings and games so that a vacation may be combined with a summer course of study.

Sixty-eight courses were offered in the summer of 1913. The session for 1914 opens July 27 and closes August 28. The December number of the Bulletin gives full information concerning the courses offered in the summer session.

SCHOOL EXPENSES

Tuition is one hundred dollars per year, one-half payable at the beginning of each semester. A fee of twenty dollars per year is charged to cover the cost of materials used by the students in the manual training department. Students taking work in any courses not required for graduation, are charged an additional fee to cover actual cost of material used in such courses.

Board and room can be obtained at prices ranging from five to six dollars per week in private families.

LABORATORY FEES

In the science courses minimum fees are charged for laboratory work. The fees for the regular course are as follows:

General Chemistry	$5.00
Food and Household Chemistry	5.00
Bacteriology	5.00
Chemistry of Nutrition	5.00
Junior Cookery (per semester)	4.00
Advanced Cookery (per semester)	4.00
Dietetics	1.50
Model Sewing	1.00
Plain Sewing	1.00

Dressmaking (per semester) - -	1.00
Millinery and Art Needlework - -	1.00
Primary Handwork - - -	1.50

In addition to the laboratory fee, students are expected to pay for any breakage which may occur.

LIBRARY AND READING ROOM FEES

A fee of five dollars, payable at the opening of the school year is required of each student.

All necessary text books are furnished from the loan text book library for the school year without any extra charge to students.

The reference library is supplied with standard reference books needed to supplement text books in different subjects and with educational and technical periodicals adapted to the needs of the students.

REFUNDS

Students who are compelled to withdraw from the Institute by reason of illness, not due to poor physical condition or ill health existing before entering, are entitled to a refund of tuition from the date when notice is received of such withdrawal, to the end of the semester.

Students boarding in the dormitories are also entitled to a refund of whatever amount has been advanced for board beyond the date when notice is received of withdrawal. Refund for advance payment for room rent in the dormitories is allowed from the date when the room is again rented, and effort is made to secure an occupant at the earliest date possible. As books and supplies for which fees are charged have to be bought in advance in quantities necessary to supply the entire enrollment, no refund of fees is made in any case.

UNIFORMS

Young women attending the Institute are required to wear uniforms during the daily sessions. Men are required to wear white overalls and jumpers in the woodworking shops and brown overalls and working shirts in the metal working shops.

A gymnasium suit is required of each student taking physical training. This work is optional for students in the home economics department. It is required for all men in the manual training department.

Special information regarding uniforms and gymnasium suits for women is sent to prospective students upon application.

DORMITORIES

Bertha Tainter Hall accomodates about thirty young ladies. The Hall is furnished with all modern conveniences, the rooms are electric lighted, and heated both by direct and indirect radiation, thus assuring ample heat and good ventilation. A large reception room, a music room, and a reading and study room for those who may prefer to study there rather than in their rooms, are provided. The hall is three blocks from the school grounds, overlooks Lake Menomin, and is in the midst of spacious, well-kept, well-wooded grounds. It is the aim to make this an ideal home for such students as wish to avail themselves of its accomodations. The hall is

in charge of a woman of experience and culture, and such regulations and supervision are maintained as insure proper conditions for health, effective work, and the proper social life of students.

Tainter Annex accomodates sixty-six young ladies and is situated on the same grounds with Bertha Tainter Hall. It is thoroughly suited to the purposes for which it is planned. It has a large central living room wtth two balconies and skylight above, making an attractive place for rest and social activities. The rooms are all arranged in suites of study and sleeping room, each suite for two students. The Annex has just been remodeled and refitted and is in every way adequate to the needs of a school dormitory. A large dining room in Bertha Tainter Hall provides meals for students in both halls.

The charge for room for the school year for each student is sixty to eighty dollars according to the size and location of the room. In most cases the lower rate prevails. The charge for meals and a definite amount of laundry work for each student rooming in the Halls is four dollars and fifty cents per week. The amount of laundry work done under the above arrangement is the average amount each student requires weekly. A list of the different articles laundered weekly without additional charge is furnished each student. Articles not included in this list are laundered at a reasonable rate at the Institute laundry.

HOMEMAKERS DORMITORIES

Two cottages furnishing home accomodations for sixteen students are provided for the students taking the Homemakers course. The cost for room and board is the same as in the Halls.

SCHOOL YEAR

The school year is thirty-six weeks in length, beginning September 7, 1914, and ending June 4, 1915. Students should arrange to enter at the beginning of the school year if possible. When this is not possible students may enter at the beginning of the second semester.

The summer session is five weeks in length, beginning July 27, 1914, and ending August 28, 1914.

Address all correspondence regarding courses of study or general work of the Institute to

L. D. HARVEY,
President Stout Institute,
Menomonie, Wisconsin.

MANUAL TRAINING DEPARTMENT

COURSES OF STUDY FOR 1914-1915

The manual training department offers courses for teachers of manual training and vocational subjects in public schools. These courses are two years in length and furnish students an opportunity to get the broad range of work in demand in the smaller school systems or give them a chance to specialize in certain groups of work. There is an increase in demand for this specialization and in order to meet the call for teachers a number of changes are made each year and new courses are offered.

The new manual training building being erected for the teaching of the the building trades will be completed by the opening of the second semester of the present year 1913-1914 and will greatly aid in the handling of these special courses. The shops in the old manual training building are being put in first-class shape for the teaching of the machine trades and the regular lines of manual training for elementary and secondary schools.

As a preparation for the building trades, courses are offered in architectural drawing, carpentry, mill work, cabinet making, wood finishing, plumbing, and masonry. The architectural drawing is eminently practical and concerns itself especially with details of construction and complete working plans for simple frame buildings. The course is closely related to the courses in carpentry which require the building of actual cottages. In connection with the advanced carpentry course, cottages are built completely, including: mill work, chimneys, fire place, plumbing, heating, painting, and inside finishing. Students in the mill work class make carpentry frames. The cabinet making course requires the making of such interior woodwork and built-in cases as are common in connection with house building. Plumbing is also correlated with the carpentry course in the complete fitting out of fixtures for the cottages built by the students taking this work. Bricklaying and cement work furnish a further opportunity for adaptation of details of these trades to the conditions of the public schools. Students in the wood finishing classes look after the painting, shellacking, and varnishing.

In the group of machine trades, students are given an opportunity to specialize along one or more of the following lines: machine drawing, pattern making, foundry practice, forging, and machine shop practice. The details of these lines of work are so adjusted that a student may prepare himself to handle any one, or to take charge of such of them as are more closely related either in thought, or in the practical handling of the work of the shops.

Other lines of work offered for the school year 1914-1915 are: elementary and advanced printing, free hand drawing and design, mechanical and architectural drawing, elementary wood work, joinery, wood turning, special shop work, primary hand work, and the various professional courses.

PSYCHOLOGY AND PEDAGOGY

This work is taken at the beginning of the junior year and is limited to a consideration of principles, fundamental in character, and to the application of these principles in the actual work of teaching. Time does not permit the study of psychology as a culture subject. The students who have so studied it, but have not given consideration to the application of its fundamental principles in teaching, will need to take the prescribed course.

Special attention is given to the psychology of attention, habit, and will. Those principles of pedagogy are conisdered which may be shown to have a practical application in the teacher's work. In the academic, shop, and laboratory work, it is the aim of the teacher not only to have the students master the special work under consideration, both from the academic and technical standpoints, but at the same time to consider the work from the standpoint of the teacher. Practical exercises are given throughout the course requiring a conscious application by students in their work of the psychological and pedagogical principles studied.

OBSERVATION AND PRACTICE TEACHING

During the senior year students are required to systematically observe the work of experienced teachers in conducting classes in their respective lines of work in the public schools. The observation work is under the direction of members of the training school faculty. The observation required is not simply a "looking on;" the teachers in charge direct the attention of the observers to define aims, methods, and results.

Methods of different teachers in the instruction and contol of classes are studied, not to be copied, but to determine how far they are based on sound pedagogic principles. The work under observation is discussed by those observing and the teachers in charge of the observation classes. Weaknesses are pointed out and the reason for the weakness shown from a pedagogic standpoint. The strong work is noted and the reasons for its strength discussed. The aim is to make students familiar with the application of psychological and pedagogical principles through a careful observation of the various ways in which these principles are applied by different teachers in different phases of the work.

After the observation work has been continued for a reasonable time, students are put in charge of classes and are given practice in teaching in different grades. Before beginning practice teaching in any grade, students are required to thoroughly familiarize themselves with the work outlined in the course of study offered for that and lower grades and by observation of the class, to determine what progress has been made in the course and what are the next steps in order. Before taking charge of the classes, they are required to prepare definite plans indicating the proper order of procedure. The practice teaching is done under the supervision of the special teacher of the particular line of work in which the instruction is given. In class work of the regular teachers in the training schools, an effort is made to bring into the consciousness of the students the pedagogical principles upon which the work there is based.

ORGANIZATION OF MANUAL TRAINING

This course is planned to cover problems in the organization and teaching of manual training in the public schools. It covers the theory of education and its application to manual training, the qualifications and opportunities of the special teacher, methods of teaching manual training, problems in administration and supervision of a special department, a study of the subject matter of manual training courses and details of equipment and costs of maintenance of a manual training department. Lectures, discussions, assigned readings and reports make up the work of the course.

1. Theory of Education
   Scope of manual training, physical education, mental training, English teaching, breadth of outlook, art training, and social efficiency.

2. Place of Manual Training in School Systems.
   Relation of the manual training department to other features of the school system. Sources of control, matters of school expenditure, school administration. Special elementary and secondary industrial and technical schools. Development of high school studies and advanced trade instruction in vocational lines of work. Relation between manual training and vocational education.
3. The Special Teacher.
   Technical and professional training, personality, the teacher's work as a student, prospects for advancement for the special teacher.
4. Methods of Teaching.
   The making of teaching plans, care of tools and supplies, preparation for lectures and demonstrations, presentation of lessons, class procedure, conveniences in teaching, control of classes, the holding of proper standards.
5. Supervision of Manual Training.
   The selection and training of special teachers, conducting teachers meetings, the keeping of records, general office work, the making of reports, relation of the supervisor to teachers and superintendent.
6. Planning of Courses and Shops.
   Formulation of purposes. Arrangement of courses and plans for school shops. Analysis of subject matter arranged by grades, primary hand work, upper grade shop work, high school courses, mechanical and free hand drawing, art crafts work, vocational courses.
7. Equipment and Maintenance.
   Kinds, quantities, and costs of tools, benches, cabinet work, miscellaneous supplies. Selection and installation of equipment for various lines of school work. Arrangement of shops, planning of equipment, lighting, storage of supplies, consideration of economy in the purchase of a school outfit.
8. Tendencies and Outlook.
   A brief review of the growth of the subject leads to a study of the present situation regarding manual training and technical education and to an examination of the tendencies and outlook.

HISTORY AND LITERATURE OF MANUAL TRAINING.

The aims of this course are to follow the growth of the manual training movement and to familiarize the student with the general literature which has been written on the subjects of manual training and industrial education. The work is carried on through assigned lessons from various references; through lectures and discussions; and written and oral reports on outside readings.

1. History
   The following topics indicate the scope of the work: Early educational history; Pestalozzi and other reformers and the effects of their work; education in Germany, France, and England, with reference to industrial education and manual training; the manual labor movement; early work in Russia as led by Uno Cygnaeus and M. Victor della Vos; the work of Otto Salomon and the Sloyd movement; a general survey of manual training and industrial education in Europe; the beginnings and development of manual training in the United States; present conditions of the courses of study in manual training; demands for industrial education and how this involves the manual training studies; work of trade, vocational, and technical schools studied and compared.
2. Literature
   Texts and reference books that are related to a particular line of work are not considered in this course but are used by the instructors in the various shop courses. The material of the course is of three kinds: books, magazines, and association or government reports. Students use several texts for class room study and recitation. Outside work is assigned and the student is required to do reading, studying and taking notes on references. In this way the material dealing especially with public school handwork, manual training, and industrial education is reviewed. The students discover the various points of view of leaders in this work and become familar with what is being done by them in various parts of the country. Comparisons are made of various systems of educational endeavor and the students are led to appreciate the value of each.

INDUSTRIAL ECONOMICS

Present day problems of an industrial nature are taken up and discussed in regard to their relations to social conditions. Questions such as the differentation of labor, trade unions in relation to trade schools, responsibility of the state in regard to factory conditions and schools within the factory are discussed.

Texts are used as a guide but considerable supplementary reading from references is necessary. One or two papers are written by each student during the year. This course does not presuppose any previous study of any of the social sciences, but is concerned entirely with the practical application of principles of economics to the industrial problems of the day. Emphasis is placed upon the study of industrial conditions which are creating the demand for vocational training in the schools.

1. Introduction
   a. Characteristics of present economic life.
   b. Evolution of society. Stages in man's development. Comparison of characteristics of each.
   c. Economic development of the 18th, 19th, and 20th centuries.
   d. Relation of efficiency to economical development.
2. Problems of Plant Location
   a. Conditions affecting.
   b. Choice of location.
   c. Construction of building. Kinds of building. Construction in relation to efficiency.
   d. Relation of efficiency to shop conditions – cleanliness, light, heat, ventilation, sanitation.
3. Forms of Industrial Ownership
   a. Entrepeneur.
   b. Partnership.
   c. Corporation.
4. Industrial Organization
   a. Military system of organization as found in the army.
   b. Military system of organization in industries.
   c. Departmental system of organization in industries.
   d. Functional system of organization in industries.
5. Development, and Possibilities of Functional Organization
   a. Aims of shop organization.
   b. Reasons for shop inefficiency.
   c. Aims of functional organization, or scientific management.
   d. Application and results of scientific management.
   e. Relation of scientific management and efficient workmen.
6. Development of Efficiency.
   a. Importance of scientific investigation. Relation to school shops.
   b. Demand and development for efficient production.
   c. Relation of efficiency to rewards or compensation.
   d. Introduction of functional organization. Division of responsibility. Importance of detailed instruction for efficiency. Devices used tending toward efficiency.
   e. Relation of management to workmen. Qualifications of officers. Supervision of employment. Methods of shop discipline.
7. Existing Wage Systems.
   a. Day work.
   b. Piece Work. Unscientific, without records. Scientific, with records. Taylor's. Differential system of wages.
   c. Premium or bonus plan. Halsey's plan. Gantt plan. Emerson plan.
   d. Profit sharing.
   e. Comparison.

8. Labor Organizations, and Problems
   a. Labor unions. Trade unions. Industrial unions.
   b. Definition, and development.
   c. Policies of labor organizations.
   d. Weapons of labor organizations. Strike. Boycott. Picketing.
   e. Employers organizations and purposes.
   f. Arbitration as a remedy for industrial disputes.
9. Labor Problems
   a. Child labor.
   b. Woman labor.
10. Legislation in Regard Industrial Conditions
   a. Conservation of the workman.
   b. Employers liability, and compensation of workmen.
   c. Legislation in regard to woman and child labor.
11. Industrial Education
   a. Vocational education. Development, tendencies, and purposes.
   b. Attitude of manufacturers and labor unions.
   c. Vocational guidance.
   d. Proper shop training and the efficient workman.

ENGLISH

Presentation of such phases of composition work as will give the student a command, both in speaking and writing, of simple, correct and clean-cut English, is the aim of this course. The special topics considered vary with the needs of particular classes.

In general these topics may be designated as: grammatical forms; sentence structure; choice of words; social and business correspondence; the preparation and organization of literary material.

The work is closely correlated with that in other departments and is based on long and short themes, talks, discussions, and papers presented by members of the classes.

A special feature of the work in English is the training in oral exposition and description. The tools and materials used, processesses employed, and products completed in the construction work furnish many of the topics for these exercises. This work is continued throughout the course for the purpose of developing ease, facility, and accuracy in the students' subsequent use of English as a teacher in the class-room.

ELEMENTARY MECHANICAL DRAWING

The course comprises twenty plates of exercises, designed to give the student; (a) skill in the use of drawing instruments; (b) ability in free-hand lettering: (c) a knowledge of geometric construction and orthographic projection; (d) practical experience in making and reading working drawings.

1. Parallel Lines in Pencil.
   Use of T square, rule, triangle, and pencil; sheet lay out, accurate measurements, use of parallel lines.
2. Upper Case Lettering.
   Gothic inclined, three-eight inch and three-sixteenth inch.
3. Lower case Lettering.
   Gothic one-fourth inch and one-eighth inch.
4. Parallel Lines Inked.
   Use of ruling pen, method of inking.
5. Conventional Lines.
   Use of 45 degree triangle, ruling pen, hidden line, center line, construction and demension line.
6. Circles and Tangents.
   Use of bow compass, use of large compass, use of center line and concentric circles.

7. Tangent Arcs.
   Use of compass, method of dividing line into equal parts.
8. Geometric Construction.
   Four selected problems.
9. Geometric Construction.
   Four selected problems.
10. Irregular Curve Drawing.
   Practice sheet.
11. Ellipse.
   Application of curve, four methods of making the ellipse.
12. Lettering.
   Upper and lower case gothic in ink.
13. Dimension Conventions.
   Lines, arrow heads, and figures.
14. Working Drawing Exercise.
   Application of orthographic projection and dimension lines. Two-viewed drawing.
15. Working Drawing Exercise.
   Application of irregular curve and dimension lines.
16. Working Drawing of Stool.
   Three-view working drawing, drawing to three-sixteenth scale.
17. Step Ladder.
   Two-view working drawing and tracing.
18. Orthographic Projection.
   Sections and true length of lines.
19. Orthographic Projection.
   Sections and developments.
20. Orthographic Projections.
   Geometric solid revolved at angle to H and V planes.

PROJECTION DRAWING

This course is designed to give further information and practice in orthographic projection, practice in the making of working drawings of wood work and machinery, familiarity with the principles of insometric and perspective drawing, training in sketching and tracing.

1. Orthographic projection; intersections; revolved views.
2. Symbols of standard cross sections.
3. Helix and application to V and square threads.
4. Standard bolt and nut, square and hexagonal.
5. Sketch, working drawing and tracing of selected objects.
6. Cams—three designs.
7. Gear blank—proportions and teeth (involute).
9. Bevel gear—cross section and elevation.
9. Working drawing of cabinet—details and assembly.
10. Isometric drawing of cabinet.
11. Perspective diagram.
12. Perspective drawing of cabinet.

MACHINE DRAFTING

This course is made up of twenty plates designed to prepare teachers in high school drawing. The work covers: sketching, working drawings, tracing, elementary machine design, and a study of drafting room methods and conventions. Lectures are given on materials of construction, strength of materials, and proper design of machinery.

1. Sketching, use of the pencil, drawing parallel lines.
2. Sketching of circle and arc.
3. Sketching turned working drawing,
4. Sketching of machine part, selection of views, center lines, outlines, details, dimensions.
5. Working drawing from other student's sketch.
6. Helix and application, V and square threads.
7. Standard bolt and nut, square and hexagonal nut.
8. Conventional threads and screws.
9. Standard symbols of materials.
10. Hand wheel from standard proportions.
11. Shaft coupling detail and assembly.
12. Pedestal box bearing.
13. Complete working drawing of machinist's vise.
14. Tracing of assigned school work.
15. Cams and a study of cam motions.
16. Spur gear and pinion, blank proportions, gear teeth design, strength for given work.
17. Rack and pinion, standard proportion.
18. Bevel gear, of rim, hub, spokes.
19. Worm gear, face and web.
20. Internal gear.

ELEMENTARY ARCHITECTURAL DRAWING

In this course the emphasis is placed upon the development of skill in drawing and upon getting an acquaintance with certain simple constructions used in small frame buildings. The nature of the work is such that it may be adapted to the use of seventh aud eighth grade classes. Drawings are pencilled only.

1. Lettering
   Style, proportions, conventional uses.
2. Lining exercise
   Practice work in use of pencil and drawing instruments.
3. Architectural conventions
   Symbols representing various materials in section and in elevation.
4. Floor, wall, and roof framing details
   Methods of construction in balloon and braced frame types.
5. Sill details
   Box and solid timber sills.
6. Cornice details
   Open and box cornics of various types—study of moldings.
7. Roof forms
   Shed, pitch, hip, gambrel and mansard
8. Window and door frame details
   Basement sash frames, window frames for double hung window, door frames.
9. Garage, tool shed, or other simple construction
   Plans, details, specifications and estimate.

ADVANCED ARCHITECTURAL DRAWING

A thorough course is given in planning, executing, detailing, specification writing, and estimating for various types of small and medium sized buildings. The work is vocational in scope and character and may be adapted to the use of either vocational or high school classes. Practical working conditions are assumed for every problem and in each case the points necessary for a full and complete understanding of the problem are given consideration in the class.

1. Cottage or bungalow plans
   Sketches, plans, elevations, and details.
2. Two story house plans

   Sketches, plans, elevations, details, specification and estimates.
3. Store building, manual training school, library, club, or railroad station
   Sketches, plans, elevations, details, specifications and estimates.

MANUAL TRAINING DESIGN

Lectures are given upon the principals of design and requirements for shop training. Practice is given in the use of the pencil, pen and ink, and wash for design purposes.

1. Pencil technique.
   Free hand drawing and design as a basis for the application of design to shop constructions. An attempt is made here to develop good pencil technique and ability to work effectively.
2. Applied Design.
   The application of design to pottery and tile making; to cement work; to weaving and basketry and paper and cardboard work; to bench woodwork; to wood turning and cabinet making; to sheet metal work, forging, and foundry work.
3. Study of Construction.
   Consideration is given to the constructive requirements of different materials, and the suitability of design to different types of construction is shown.
4. Outlines and fastenings
   Through a study of typical pieces of construction peculiarly appropriate to their intended use, students are shown methods of adapting design to requirements of use of finished constructions. By means of a study of general shapes of constructions and the modification of small details, it is seen how the fundamental lines of a design may be refined. By considering the leading lines and fastenings of construction as decorative features, one method of emphasizing details of construction is seen. Designs are made for various shops.

FREEHAND DRAWING

A sketch class for teachers of shop work gives special attention to the making of free hand drawings in pencil of shop projects and details of shop equipment. Practice is given also in the making of blackboard sketches, and the use of pen and ink for illustrations of the making of school products. This course is planned especially for shop teachers' use in making ideas clear to pupils.

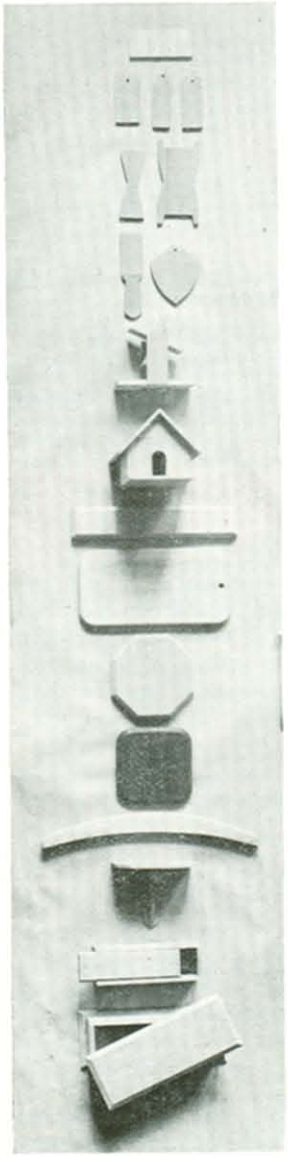
1. Pencil practice.
   Pencil practice begins with the study of lines and tones in pencil, and the use of the different qualities of pencil. This is followed by a representation of different materials in pencil with a study of surface textures.
2. Perspective Sketching.
   Objects are sketched in outline in perspective, and include; furniture and interiors, student constructions from the manual training shops, and illustrations of students at work at various occupations.
3. Sketching in light and shade:
   Sketching in light and shade covers in pencil and charcoal the same general line of work as that which is done in outline. This is followed by black board sketching and a rapid use of the soft pencil for the making of explanatory sketches.

ELEMENTARY WOODWORK

Elementary woodwork includes such tool processes and construction work as may be given to public school classes in the fifth, sixth and sev-

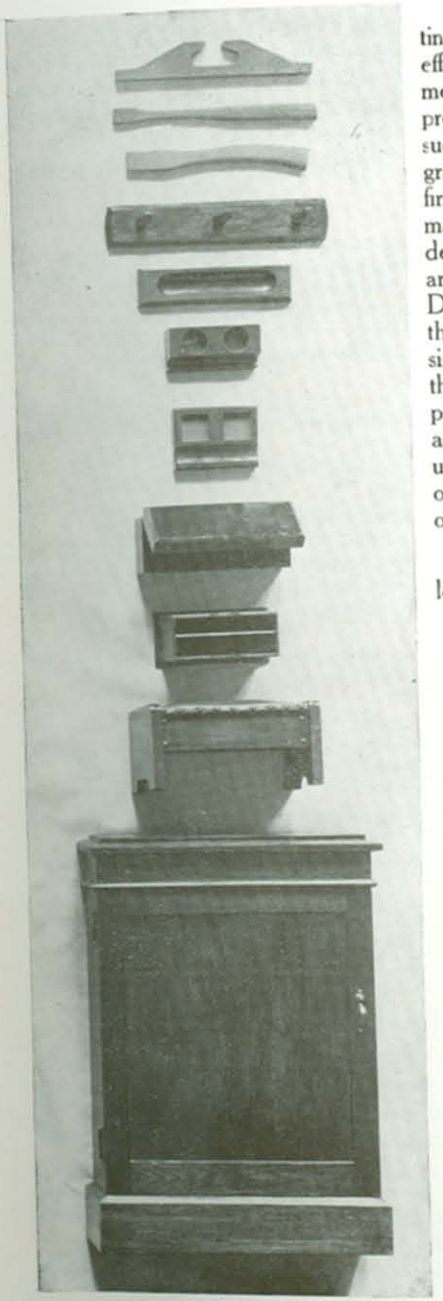
enth grades. A course of models and exercises suitable for these grades is outlined below.

In connection with the working out of these problems the students make a thorough study of methods of teaching, courses of study, and equipments necessary or desirable. Students also begin to solve some of the problems of teaching by preparing and presenting lessons or demonstrating tool processes as they would be given to a public school class.



1. Name plate.
   Use of plane, try square, and rule.
2. Key label.
   Use of brace and bit.
3. Plant label.
   Laying out, chiseling slant cuts.
4. Shipping tag.
   Use of compass, chiseling and sandpapering rounded end.
5. Cord winder.
   Use of saw, more difficult chiseling.
6. Fish line winder.
   Cutting ends with saw and chisel.
7. Pencil sharpener.
   More difficult laying out and chiseling.
8. Match scratcher.
   Putting on sandpaper.
9. Water Wheel.
   Making half lap joint, assembling, and nailing.
10. Bird house.
    Squaring several pieces of stock to size and assembling.
11. Bill file.
    Squaring up rough stock to three dimensions, chamfering, boring.
12. Bread board.
    Laying out rounded corners and edges, use of chisel and file.
13. Game board.
    Laying out octagon, chamfering.
14. Plant Stand.
    Chiseling curved corners, fastening feet with glue and brads.
15. Coat hanger.
    Laying out curve to measurements, use of spoke shave.
16. Bracket shelf.
    Designing. use of coping saw, fitting of parts, careful sanding of surfaces.
17. Pencil box.
    Cutting groover, fitting cover.
18. Glove box.
    Review of previous exercises, more difficult fitting of corners, staining and waxing.

UPPER GRADE WOODWORK



Upper grade woodwork continues the same lines of study and effort as are suggested in the elementary woodwork course. The problems worked out here are such as can be given in the eighth grade or first year high school. The first part of the course consists of making several small models, the designs and dimensions of which are given out by the instructor. During the latter part of the course the students are required to design two or more problems and then to execute these. Basswood, pine, butternut, oak, maple, birch, and gum are some of the woods used. The staining and finishing of these woods occupies a portion of the time.

A typical course is outlined below:

1. Whisk broom holder.
   Laying out, boring, sawing, chiseling.
2. Hat Rack.
   Chamfering, designing pegs.
3. Hammer handle.
   Laying out, use of spoke shave and sandpaper, oiling.
4. Hatchet handle.
   Laying out curved form.
5. Glove box.
   Cutting rabbet joint, sawing apart, hinging, staining, and shellacking.
6. Pen tray.
   Gouging, polishing.
7. Pen and ink stand.
   Designing shape, careful cutting to fit ink well.
8. Letter box.
   Squaring to exact dimensions, assembling.
9. Foot stool.
   Upholstering.
10. Wall cabinet, or other piece of furniture
    Grooving, paneling, mortising and tenoning, fitting and hanging door; staining and shellacking.

JOINERY

The course in joinery aims to give the student thorough practice, a good knowledge of the use of the common bench tools and to familiarize him with the different parts of each tool and its proper care. The different woods and materials which are used in the course are discussed, and demonstrations are given in the making of joints. An attempt is made to present work which will lead up to the trades of carpentry, cabinet making and pattern-making.

1. Lap Joint.
   Planing working face and edge; familiarity with the different parts of the plane: proper method of using plane; position of body and arms when planing; squareing up stock; familiarity with the try square and its parts; laying out; use of the knife, try square and rule; gauging; the marking gauge and its parts; proper method of using it; sawing to lines; use of the cross cut saw in working to a line; chiseling; the chisel and its parts; chiseling to a line; fitting of joint.
2. Nail or Tool Tray.
   Laying out of duplicate parts on sawed out pieces of stock for a box construction; making of dado and lap joints, fitting sides and nailing, fitting in bottom and nailing.
3. Mortise and Tenon Joint.
   Squaring up stock, laying out, sawing and chiseling, fitting joint.
4. Double Dovetail Joint.
   Laying out dovetails, sawing to lines, chiseling and fitting.
5. Mitre box.
   Ripping out rough stock, the rip saw and its use, planing stock to dimensions given, screwing together, the use of screws and methods of driving them, laying off mitres on box and sawing to lines, finishing ends and smoothing entire box.
6. Saw Points.
   This exercise is given to familiarize the student with the different kinds of saws by cutting from thin strips of wood the teeth of a cross cut and rip saw.
7. Drawing Board.
   Ripping from rough boards the stock needed, jointing edges for gluing, gluing up, rabbeting ends for rails, squaring up the surfacing, finishing with sand paper. Talks on materials used such as glue, clamps, and planes.
8. Tee Square.
   Finishing and smoothing hard wood surface, rounding corners of head, gluing and screwing blade on head.
9. Project chosen by student. Inlaying, or carving, and gluing up, or a problem involving work inhard wood.

A number of supplementary joints are given in this course and among them are the slip mitre, half lap dove tail, half blind dove tail, a splice joint and several others which involve accurate laying out and cutting to lines. As much work is given as the student is capable of handling.

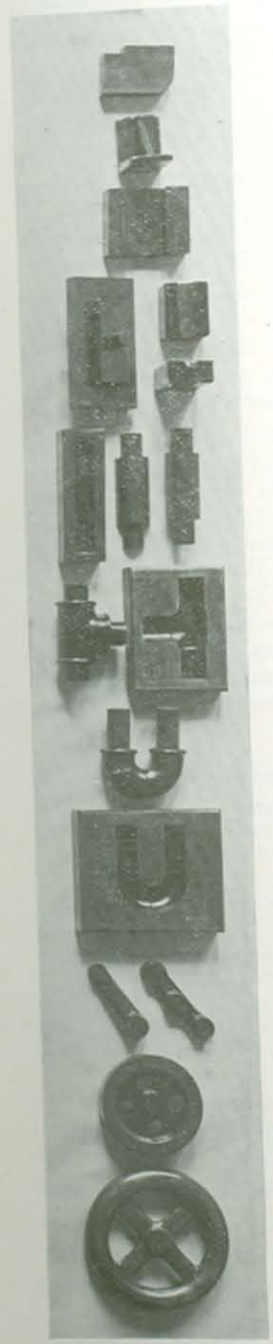
PATTERN MAKING

The course in pattern making is carried on with the thought of giving the student, thru a series of exercise patterns, the fundamentals of pattern making and molding as far as possible.

With these or a similar series of exercise the student is able to teach these principles.

More complicated patterns to be used in foundry and machine shops are given as soon as he shows ability in this line and the course is limited only by the student's time and ability along this line.

One or two weeks of foundry practice is given in connection with this course.

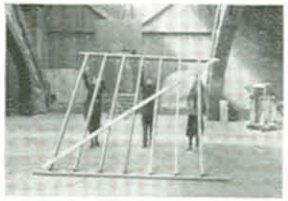


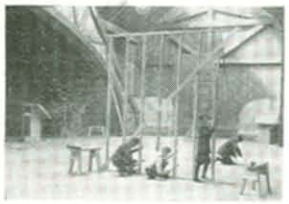
1. Pattern for a Planer Block.
   To teach the principles of pattern making such as selecting stock, laying out a small pattern on a solid piece of wood, the need of accuracy in measurements, allowance for shrinkage and draft, sandpapering and shellacking.
2. Pattern for Angle Iron.
   The laying out and constructing of a small pattern from several pieces of wood, use of leather and other fillets and methods of placing them, the several methods of molding such a pattern.
3. Pattern for Gibbed Way.
   Different methods of molding such a pattern, the use of loose pieces to facilitate the operation of molding; method of construction and fastening loose pieces to a pattern.
4. Pattern for Jig Plate.
   Construction of a built up pattern using center lines; use of core prints in making cored holes, allowance for finish for machining in machine shop.
5. Core Box for Jig Plate.
   Use of cores, core prints and core boxes; different methods of constructing small core boxes and the advantages derived from each.
6. Pattern for Brass Bushing.
   Methods of preparing stock for split patterns and the use of screws, dogs, glue, to hold parts together while being turned; pattern turning and the use and care of the lathe and tools.
7. Core Box for Brass Bushing.
   Construction of a half core box; use of core box plane.
8. Patterns for Pipe Tee.
   Making working sketches from casting and making pattern from them; method of constructing a split pattern built up of turned pieces; fitting, gluing and nailing.
9. Core Box for Pipe Tee.
   Laying out irregular core box on solid piece and gouging out; the use of the different tools used.
10. Pattern for Return Bend.
    To teach further the making of working sketches from castings, the construction of split pattern using parts turned on chuck and spindle of lathe, the use of the template, and the balanced core prints and cores.
11. Core Boxes for Return Bend.
    Methods of turning parts of core box on lathe chuck, building up core box with other parts gouged out.
12. Pattern for Arm of Eccentric Wheel.
    Method of laying out and sawing a small irregular pattern, the use of the knife in whittling patterns, training the eye in getting good curves.
13. Pattern for Gear Blank.
    Making small turned pattern on lathe chuck, re-chucking pattern to finish off reverse face, marking centers for holes in web, boring holes and sandpapering draft, using spindle sandpaper roll.
14. Hand Wheel Pattern.
    Method of gluing up a small pattern in segments, use

of chuck and methods of fastening segments, ways of making and laying out arms for hand wheel, gluing in position with bosses in place, turning up whole pattern after it is glued, finishing arms and rim after turning.

ELEMENTARY CARPENTRY

The aim of this course is primarily to teach the fundamental tool processes of carpentry and the elements of frame building construction. These tool processes are arranged in a graded series of models or exercises, designed so as to afford an opportunity for the development of skill in tool manipulation and familiarity with common materials of carpentry and their uses.





In order that the work may be a direct preparation for building operations the materials are full size, the tools such as are found in a carpenter's kit, and the exercises the same as those encountered in practical work.

The points of emphasis are: a training in the use and care of carpentry tools; such work as will permit of a sequential order in the different stages; and the acquisition of a body of information related to the work of the carpenter. This includes the listing and grading of lumber, figuring quantities and costs, the selection of proper grades for different purposes, and some of the simple mathematical calculations involved in laying out various members of construction in frame buildings.

Suggestive exercises are as follows:

1. Sections of frame house
   Floor and wall frames, sections of sill and cornice as shown at corner of building.
2. Rafter cutting
   Common, hip and valley, and jack rafters.
3. Outside finish
   Cornice finish, shingling, water table, corner boards, setting frames, siding
4. Inside finish
   Setting door jambs, fitting and hanging door, fitting lock, laying and scraping a hardwood floor.
5. Miscellaneous exercises
   Erecting scaffolding, making various joints, sharpening and caring for tools.

Students desiring to take the advanced course in carpentry during the senior year get the fundamental tool training in this course. The kind of work undertaken in Elementary Carpentry is possible to introduce in nearly any school on account of the fact that comparatively little space is needed for putting up the work.

ADVANCED CARPENTRY

The work of this course consists of the actual construction of a house or cottage, either on a permanent site or in the shop. The carpentry shop in the new building is provided with a large opening through which a completed building may be moved. The shop is 36x80 feet with balconies at each end and with outside sliding doors 14 feet square at one side for moving small buildings. When a completed large building is to be carried from the shop a piece of the side wall 20x27 feet is taken out to furnish the opening.

An opportunity is given, not only for an acquaintance with the principal operations of the carpenter's trade, but also for the acquisition of some skill and speed in performing these operations. Related theory work in advance of that given in Elementary Carpentry is a part of the course. Various building materials used by the carpenter are studied with regard to the kind or grade suitable to a given purpose and methods of figuring quantities and costs.

1. Framing.
   Placing and leveling sills and floor joists; laying lining floor; erecting walls; placing second floor joists; plumbing walls; cutting rough openings in studding and joists; sheathing; laying out, cutting and placing common, hip and valley, and jack rafter; framing porch.
2. Outside Finish.
   Cornice work; shingling; setting frames; siding; porch finish.
3. Inside Finish.
   Cutting and placing jambs; fitting and hanging doors and sash; fitting hardware; placing standing finish; laying and scraping floors.
4. Stair Work.
   Laying out, cutting and placing rough stringers for front and back steps; finishing with risers, treads and skirt boards.

Such constructions as are represented in this course may be carried on whenever a party can be found who will provide the materials in exchange for the ownership of the building, or where a completed building can be sold for the cost of materials used. In some cases, buildings needed by the school furnish desirable problems for school carpentry classes.

MILL WORK

This course is given for the purpose of acquainting students with precautions necessary around mill machinery, and giving instruction in the care

of machinery and belting, the use of practical mill terms, setting up and running of machines. The course is offered to cover conditions where teachers are expected to be entrusted with the care and working of the machines.

1. Selection of Machinery.
   Approximate prices of machines, factors in purchasing mill equipment.
2. Care of Machinery.
   Care of planers, jointers, rip and cut off saw benches, band and resaws, mortisers, tenoners, shaper, grinders, the attachments to all the above, such as the sharpening of planer, jointer, tenoner and sharper knives; gumming, swaging or setting and filing of circular, band, and resaws, mortiser chisels; oiling and adjusting of bearings, ning up, babbitting, scraping, fitting and adjusting of new bearings.
3. Setting Up and Running.
   Setting the edge tools, and feeds of the different machines for such as the requirements from time to time demand, testing to see if required results are obtained, methods of precaution against accidents.
4. Speeds.
   Figuring speeds of line shafts, counter shafts, speed of driver and driven pullies, cutting speeds of machines and horse power required.
5. Belting.
   Care, horsepower, and kinds of belting, prices and comparison of different kinds, different kinds and ways of lacing, proper tension and ways of running belts.
6. Knives.
   Laying out, grinding of shapes required for moulding knives, tempering of knives.
7. Stock.
   Cutting stock for other classes and all millwork projects by the use of power machinery. The sequence of operations for the best results considering the work in hand, materials to be used, the economy of materials and time.
8. Frames.
   The terms applied to different parts of window and door frames, the operations in making, figuring sizes and prices of frames and parts; basement frames, brick and ordinary frame constructed house frames.
   Making mill bill, figuring and milling, setting up and machining stock, and such bench work as the assembling or setting up of frames.
9. Sash, Windows, Screens, and Doors.
   Terms of parts and members, prices, construction, making mill bill, milling, setting up of machines and machining different parts of stock, assembling and smoothing.
10. Built-In Cabinets.
    Planning, sketching and drawing of the modern built-in cabinets for various purposes, figuring mill bill, milling and assembling.
11. Interior Finish and Stair Case Work.
    Covered in a similar manner to Built-In Cabinets.

CABINET MAKING

An eighteen weeks course covers the principles, methods and actual practice of cabinet construction, with a combination of joinery exercises that are to be made with the use of power machinery. Commercial methods are followed as nearly as possible.

1. Working Drawing.
   At the beginning, the working drawing and details of joints and construction, tends to acquaint the beginner with the work that is to be done.
2. Mill Bill.
   The mill bill indicates the name, number, sizes, kinds of material and operations in milling.

3. Milling.
   The milling of the parts or pieces consists in the economic cutting by the use of power machinery.
4. Face Marking.
   Why and how face marking should be done for the purposes that require them.
5. Pairing Up and Laying Out.
   The laying out for mortises, tenons, relishes, and grooves for panels, to serve in connection with face marking and pairing.
6. Machining Stock.
   The different parts of machining, done according to shop methods, requires the seting up and running of power mortiser, tenoner, groovers and the relishing, rabbeting, beveling, the tapering of legs, and the raising and beveling of panels.
7. Bench Work.
   The removing of mill marks and other indentations by the use of planes, scrapers, and sand-papering as the case may require.
8. Gluing and Clamping.
   This covers the use of boiled and prepared glue, the preparation and boiling of glue and applying both kinds, and the proper application of clamps.
9. Assembling.
   Smoothing and fitting together of sections and the fitting and gluing of joints in top. In connection with the assembling of the cabinet follows the making of dove-tail joints for the drawer and the fitting of drawer and door to cabinet, fitting of hinges and catch for the hanging of the door and the cleaning up and sandpapering to prepare the cabinet for finish.
10. Finishing.
    The finishing includes the staining, filling, shellacking and varnishing with a rubbed dull finish.

ELEMENTARY WOOD TURNING

Wood turning is given for teachers of high school classes and covers exercises planned to give a familiarity with both turners' and pattern makers' work. Students are introduced to the use of power machinery and are required to take proper care of lathes and tools. After getting the brief acquaintance with the problems of elementary wood turning, students may elect the advanced course and master some of the difficulties of more advanced wood turning.

A series of exercise pieces is made in soft wood, bringing in the turning between centers of cylinders and cones, grooves, beads, and reverse curves between centers. This is followed by face plate and chuck work. Hardwood applications of turning exercises include tool handles, mallets and rings. Work in preparation for pattern making includes the making of several pieces between centers and on the face plate by scraping, and a few simple turned patterns. Discussions cover the selection of equipment, planning of courses in wood turning, and methods of teaching the subject. The following projects are made during the course.

1. Chisel exercises
   Plain cylinder, step cylinder, cones, and V grooves
2. Gouge exercises
   Circular grooves and spindle turning.
3. Tool handles
   Bench chisel handle, turning tool handle.
4. Mallet
   Making head and handle, fitting and polishing
5. Face plate exercises
   Rosette and chuck work
6. Face plate applications
   Hard wood ring and tray

ADVANCED WOOD TURNING

Students in the senior class are given opportnnity to elect wood turning as one of the subjects for specialization and are given a series of projects involving a review of a part of the junior course in elementary turning and a variety of problems which being in many different operations essential for the specialist in the subject. Attention is also given to the professional side of turning in the public schools and students are required to present typical lessons during the course. An outline of practical problems follows:

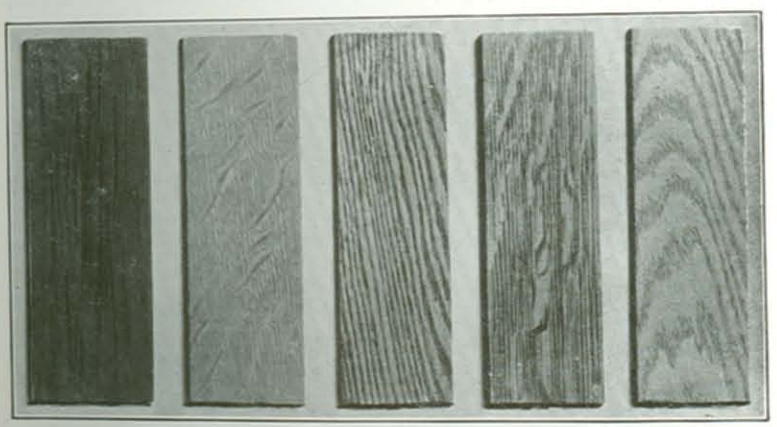
1. Chisel Exercises.
   Review of work of elementary course.
2. Gouge Exercises.
   Review of work of elementary course.
3. Tool handles.
   Making a variety of handles for woodworking tools.
4. Oval Turning.
   Hammer handle, screw driver handle,—applications of three center work.
5. Gavel Turning.
   Design and turning of two or more gavels.
6. Face Plate Exercises.
   Face plate turning, chuck work, and fitting.
7. Face Plate Applications.
   Towel ring, card tray, candle stick, ball.
8. Fitting Work.
   Problems involving the accurate turning and fitting of parts of turned constructions, such as boxes, mirror frames, and small stands.
9. Built Up Work.
   Dumb bells, Indian clubs, and other applications.
10. Larger Problems.
    Table legs, pedestals, and racks.
11. Rectangular turning.
    Problems in turning rectangular spindles.
12. Miscellaneous Problems.
    Oval work in general, making turned knee, clamp chuck work, polishing and finishing.

ELEMENTARY WOOD FINISHING

Two courses are offered in wood finishing, one for beginners and one for students who have had the elementary work. They cover the making of a series of panels of different widths. The surfaces being planed, scraped, sand-papered, stained, filled, and polished, showing the method and value of different types of finish as pieces of regular sequenced work. In addition to this, students are given practical work in painting, interior finishing, and the finishing of furniture. The scope of the course is as follows:

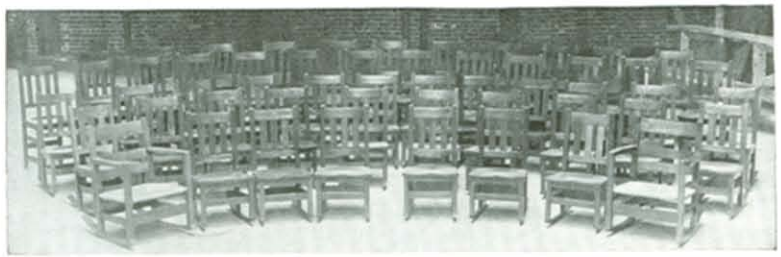
1. Pine Panel.
   One face oiled two coats; the other face rubbed and varnished with one coat of shellac and two coats varnish rubbed with pumice stone and oil.

2. Oak Panel.
   One face stained, shellacked and waxed; the other face filled, shellacked, varnished with three coats, and rubbed.
3. Oak Panel.
   One face natural finish, filled, shellacked, and varnished three coats; the other face divided to show the steps in the varnish finish.
4. Birch Panel.
   One face of natural finish, shellacked and varnished with two coats; the other face stained, shellacked, given four coats of varnish and hand polished.
5. Gumwood Panel.
   One face given a white enameled finish; the other face showing the steps in making the white enamel finish; including primer, two coats of flat white, one coat white enamel, rubbed with pumice and water.
6. Oak Panel.
   Both faces original in methods of treatment.
7. Fumed Panel.
   Both faces fumed; one face moistened with tannic acid, shellacked and waxed.
8. Other Panels.
   Varied to suit the time, interest and ability of the class.
9. Practical Work.
   Painting school-room walls, cottages built by students, and pieces of equipment; finishing various jobs about the school.
10. Lectures.
    Preparation of the wood; planing, scraping, and sanding; stains and staining; production and use of different stains; formulas for making water and spirit stains; fuming; fillers and their composition and use, methods of filling hard and soft woods; open and close grained woods; wax and its character and preparation, different uses; rubbing with sand paper, with pumice stone, with rotten stone; polishing, use of curled hair, use of steel wool; selection and care of materials; commercial practice in wood finishing; suggestions for handling wood finishing in school shops.



ADVANCED WOOD FINISHING

Students who have had work in elementary wood finishing and those who wish to develop special ability in making rubbed finishes are offered an advanced course in general wood finishing, varnishing, and polishing. Those enrolled in woodworking classes and others who expect to teach furniture construction and feel the need of more attention to the making of a fine finish are advised to take this course.



A PROBLEM IN REFINISHING CHAIRS

A part of the time is given to the finishing of sample boards and a part to the finishing of completed objects. Students in this course are given a chance to finish the interior woodwork of the carpentry construction problems and where possible an opportunity for refinishing furniture.

Attention is given to a study of materials and commercial practice and suggestions are made for handling the finishing part of school shop courses.

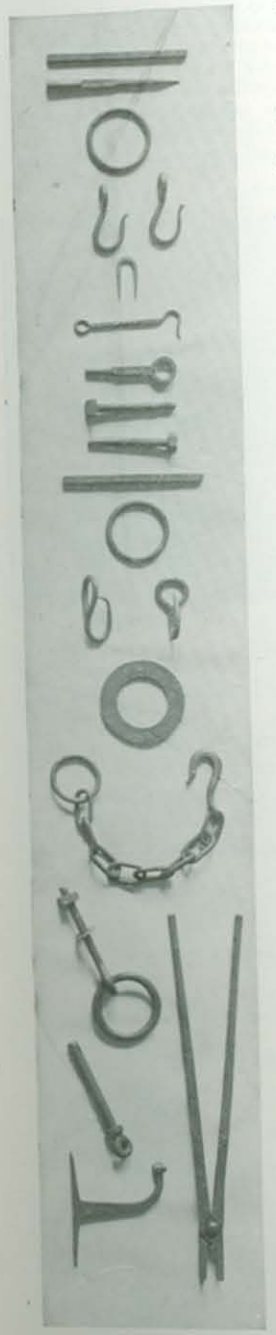
SAW FILING

This course gives a study of different kinds of work which saws perform in different kinds of wood and the shapes of saws and their teeth necessary to meet these demands. It gives practice in laying out the proper shapes of saw teeth for their respective lines of work; fitting a saw, or putting it into proper condition and, keeping the teeth properly shaped and spaced in successive fitting.

1. Drawing of Teeth.
   Study of teeth to get proper angles for cross cut and rip saws.
2. Laying Out Teeth on Piece of Soft Steel.
   Reproducing above drawing on the sheet steel, which is given to the student in suitable size for filing practice.
3. Roughing Out Teeth.
   Cutting away waste stock with file, or in some cases getting teeth roughed out in machine shop.
4. Top Jointing.
   Evening up the points of the teeth on a line and forming a guide by which to bring the teeth to a point.
5. Setting.
   Bending the teeth by different methods for the purpose of giving clearance for saw blade.
6. Sharpening.
   Filing teeth on face, or front and back, to bring them to a point on the top jointed line, and give them the proper pitch, and fleam or bevel.
7. Side Jointing.
   Evening up the amount of set, and removing bur edges formed by filing.
8. Application to Actual Saw Filing.
   After exercises in rip and cut of teeth have been mastered, students take up the actual filing of saws for practical use.

ELEMENTARY FORGING

Before any practical work is attempted the student masters certain preliminary matters such as building and care of fire, position at anvil and forge, proper handling of tools, care of equipment and room. The problems offered in elementary forging are as follows:



1. Drawing Exercises.
   Building and care of fire, handling of tools, position at anvil, the manipulation of iron, methods of drawing, (1) round stock to square, and (2) square to round.
2. Bent Ring.
   Calculation of stock, upsetting ends, bending to circle.
3. Hammock Hook.
   Bending eye, forming, drawing, bending.
4. Staple.
   Drawing, bending.
5. Gate Hook.
   Drawing round stock to square, square stock to round, bending, and twisting.
6. Eye Bolt.
   This is a suplementary problem, and involves the following tool processes; drawing square stock to flat; bending eye, drawing square stock to round, thread cutting, as well as calculation of stock necessary in forming eye.
7. Square Head Bolt.
   Upsetting, forming.
8. Hexagon Head Bolt.
   Supplementary, upsetting, forming.
9. Welding Exercise, Fagot Weld.
   Introduction to process of welding, building and keeping of fire, welding heat, effect of light and heavy blows.
10. Ring.
    Simple scarf weld, and upsetting.
11. Welded Hook.
    Supplementary, bending, welding and shaping.
12. Flat Washer.
    Supplementary, calculation of flat stock, bending of stock, upsetting, welding, shaping.
13. Chain.
    Eight links, bending, welding, shaping, assembling of links.
14. Hook.
    Upsetting, fullering, drawing, punching, forming, bending. This is connected to the chain links, problem 13.
15. Eye Bolt and Ring.
    Bending, welding and assembling of pieces.
16. Clevis Pin.
    Supplementary problem, using additional stock by welding collar, fullering, forming, punching.
17. Coat Hook.
    Introduction of design in regard to form. Shaping, splitting, welding, drawing, drilling.
18. Flat Jaw Tongs.
    Shaping, welding of soft steel and iron, drilling, riveting, assembling.

In all the above problems there is a definite relation existing between each problem. Each one depends upon the one before for certain information, and at the same time offers certain new information to the student. The supplementary problems are merely additional problems for students who work faster than the class. The acquiring of skill in the manipulation of iron and steel and the handling of tools is necessary but the ability to teach others the same things is

equally as important to the manual training teacher. Time is given to the development of methods of teaching forging, planning of courses, the relationship of problems in regard to tool processes and applications. From time to time students give sample demonstrations of problems and give reports upon the text used, upon reference readings, and upon current topics of interest to the metal worker. Study is also made of the selection, care and maintenance of equipment. Note books are kept in connection with the work and cover the complete course. Each problem is taken up under the following heads: (1) Sketch or complete drawing, (2) Amount and kind of material, (3) Tool processes, (4) Steps in construction, (5) Remarks.

ADVANCED FORGING

The advance forging consists of two parts: (1) tool smithing and (2) art smithing. Each course is nine weeks in length.

Note books are required in each of these courses and cover (1) complete drawing, kind and size of stock, (2) steps in construction and (3) general remarks in regard to place in course or steps in construction.

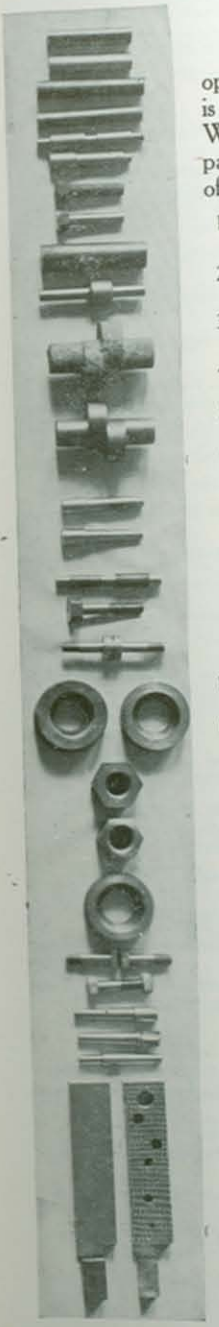
In connection with the tool smithing a text is used and the student is expected to be familiar with the heat treatment of steel, its various compositions and uses, as well as methods of production.

Tool Smithing -

1. Simple Bench Tools.
   Cold chisel, center punch, chipping chisel, counter sink bit, counter bore, screw driver.
2. Lathe Tools.
   Side boring tool, side tool, cut off tool, thread tool, round nose tool, diamond point.
3. Simple Forge Tools.
   Set hammer, hot cutter, cold cutter, hardie, handle punch.
4. Hammers.
   Straight pene and round pene.

Art Smithing—

1. Forms of Ornamental Iron Work.
   Twists, spirals, bulbs.
2. Simple decoration.
   Handles, drawer pulls, fork, bill file.
3. Sheet Metal Problems.
   Lanterns, lamps.
4. Decorative Forging.
   Fire sets, andirons, brackets.



ELEMENTARY MACHINE SHOP WORK

A course of exercises embodies the fundamental operations on each machine. The following arrangment is the sequence followed when conditions are possible. Where it is convenient, exercises finished in an earlier part of the course are used again, thus saving a great deal of routine work.

1. Cylindrical turning of soft steel.
   Location of centers, testing, drilling, tool setting.
2. Cylindrical turning.
   Turning to a definite size, turning roughly to shoulder.
3. Cylindrical turning.
   Accurate location of shoulders, making fillet, end facing.
4. Cylindrical turning of bolt forging.
   Turning, facing, squaring up a shoulder.
5. Cylindrical turning of machinery steel.
   Turning, using coarse feeds and deep cuts, accuracy, speed.
6. Cylindrical turning.
   Turning cast iron, squaring to a shoulder, location of centers,
7. Taper turning.
   Calculation of taper, turning taper, fitting taper, file finish., polishing.
8. Screw cutting.
   Calculating change gears, cutting right hand and left hand threads.
9. Screw cutting for accurate thread.
   Right hand thread, fitting thread to guage, getting accurate thread of correct shape and perfect tool finish.
10. Screw cutting for speed.
    Closer limits of accuracy and finish than in No. 9.
11. Chucking and boring of cast iron ring.
    Use of chuck, use of boring tool, use of limit gauges.
12. Internal threading of hexagon nut casting.
    Accurate chucking, boring, and internal threading.
13. Milling.
    Use of milling machine to produce flat surfaces.
14. Milling of gear teeth.
    Gear teeth, shape of teeth, indexing.
15. Milling machine bolts.
    Milling square, direct indexing, use of end mill, use of parting tool.
16. Milling head of hexagonal bolt.
    More practice in No. 15 to prepare more fully for No. 17.
17. Spur center.
    Setting up machine for a particular operation, accurate measurements by use of graduated lead screws.
18. Shaper exercise of cast iron.
    Use of shaper tools, planing up a rectangular block, leaving smooth surfaces and all faces square with one another.
19. Bench exercise with steel block.
    Chipping and filing, use of common bench tools.
20. Drill press exercises using stock from exercise 18.
    Holes are accurately laid out from blue print, drilling, use of gouge to draw a drill to center, use of drill circles, must come within limits fixed by limit gauge.
21. Common hand finishes on above piece of stock.
    Surfaces are filed and polished and given representative finish common to the machine trade, as clouding, spotting, and scraping.

ADVANCED MACHINE SHOP WORK

A course of work is offered to enable the student to apply the principles learned in the preliminary work, to the solution of larger and more difficult problems.

1. Lathe Work.

   Standard arbor. (Stock—tool steel) Careful centering of stock; accurately forming center holes; cylindrical turning; tools and methods of handling tool steel.
   Reamer. (Stock—tool steel) Cylindrical turning; working to very close limits, study of kinds of reamers and uses.
   Tap. (Stock—tool steel) Cylindrical turning; polishing; threading to perfect shape, finish and accurate dimensions.
   Milling cutter. (Stock—tool steel) Cylindrical turning; chucking; facing; centering; drilling; boring; recessing; turning on arbor.
   Jig bushings. (Stock—tool steel) Chucking; facing; centering; drilling; boring; turning on arbor.
   Plug gauge. (Stock—tool steel) Centering; turning; polishing; nurling.
   Gear blank. (Stock—cast iron) Chucking; facing; centering; drilling; boring reaming; turning on arbor to very close limits; calculation for gearing; study of systems of gearing.

2. Shaper Work.

   Jig body on shaper. (Stock—cast iron) Laying out of work; setting of work; use of different tools and working to close limits.
   Key way. (Stock—gear blank) Setting of tools and use of gauge.

3. Planer Work.

   Planer is used upon such large work as happens to be in progress.

4. Drilling.

   (Stock—jig casting) Drilling of holes for the necessary screws and bushings; accurate laying out; correct location of hole in reference to lay out.

5. Milling Machine Work.

   Exercise 1. (Stock—standard arbor) Milling spots on ends of arbor to clamp the dog screws upon when in use; use of plain circular cutter.
   Exercise 2. (Stock—gear blank) Cutting of gear teeth; setting of machine; selection of cutter for shape of teeth; indexing; calculation of settings; use of graduated lead screws.
   Exercise 3. (Stock—reamers) Studying shape of flutes and angles of clearance; indexing to get irregular spacing.
   Exercise 4. (Stock—tap) Milling square for wrench, milling flutes.
   Exercise 5. (Stock—milling cutter) Spiral milling; use of charge gears; setting of cutters for shape of tooth.
   Exercise 6. (Stock—jig casting) Bushing holes finished accurately to size with boring tool, location of holes by use of lead screws of machine.

6. Finish Grinding.

   All steel work such as tools are finished after hardening upon the universal grinder.
   Exercise 1. (Stock—arbor) Use of grinder for finishing of cylindrical surfaces; use of micrometers: use of micrometer stop on machine.
   Exercise 2. (Stock—reamer) Cylindrical grinding to close limits.
   Exercise 3. (Stock—milling cutter) Internal grinding; facing; finishing on arbor between centers.
   Exercise 4. (Stock—jig bushings) Internal grinding on arbor between centers; grinding on arbor between centers; grinding up to a shoulder.
   Exercise 5. (Stock—plug gauge) Cylindrical grinding to limit of .0001"; finishing by lapping.
   Exercise 6. (Stock—milling cutter and reamer) Relieving cutter edges; giving proper angles of rake and clearance.

7. Assembly and repair work.
   Machinery needed for further equipping the school is sometimes built. So far as is practical the repairing needed in the various departments is done in the school shops.

8. Bench Work.
   A large amount of bench work is required to enable the student to do any one of the above exercises, especially in assembly and repair, so no definite exercises in bench work are done.

9. Professional Work.
   Reading is required, also papers are called for which deal with the work in hand, giving in each case a lesson plan and all the demonstration talks necessary to present the exercise to a class. Examinations are given to test the accuracy of the student's organization of the subject matter. A text is used and also from time to time articles in the current trade papers are assigned for reading and discussion.

MILLWRIGHTING

This course is intended to enable woodworkers to learn the care and simple repairing necessary to keep their equipment in running condition. Also the problems which are encountered in the installation of equipment are considered. A piece of shafting is installed, pulleys are located and machines are driven from the shaft.

1. Shafting.
   Study of sizes, kinds and methods of locating; leveling and aligning a piece of shafting as an exercise or for a completed job.

2. Hangers.
   Study of types; adjustment and alignment for shafting above (1).

3. Bearings.
   Study of kinds, methods of lubrication, advantages and disadvantages of different bearings; babbetting and scraping of bearings and cutting of oil grooves for shafting (1).

4. Pulleys.
   Study of kinds, choice; calculations for speeds and alignment for specified requirements.

5. Belting.
   Study of kinds, care, and use; calculating horse power; lacing and putting into use on above job.

6. Motors.
   Study of direct current and alternating current motors, including the theory, characteristics, and selection; repairing and adjusting motors.

7. Wiring.
   Study of power lines, size, factors to be considered, lighting lines, and the use of conduit; actual work connecting motors.

8. Bench Work.
   Chipping, filing, drilling, tapping, threading by use of dies; key way cutting and key fitting.

9. Text and Reference Study.
   References are given and the student is required to prepare papers on the subjects assigned.

FOUNDRY PRACTICE

The idea of this course is to give the student as much practical work as possible in molding, managing the cupola and brass and aluminum founding. Founding is an art which requires considerable experience before successful castings can be made and in this course the student is given work

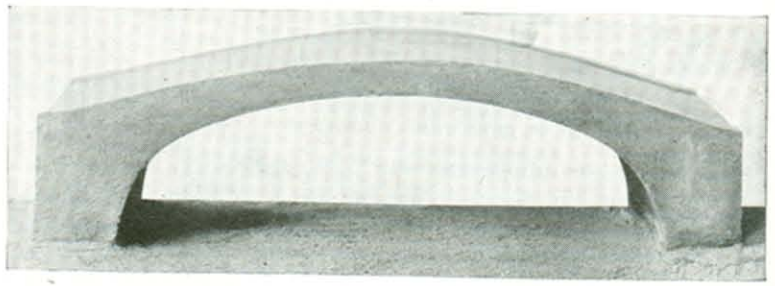
with a number of patterns illustrating different ways of molding before the actual pouring takes place. Talks and demonstrations are given at different times during the course on the materials used and different methods of molding certain patterns.

1. Bench and Floor Molding.
   Bench Molding. Exercises in molding small patterns in two part flask involving the use of the ordinary molder's tools and methods, practice in proper ramming, venting, gating, and coping down; molding split patterns and patterns with cores, use of two and three part flasks.
   Floor Molding. Exercises in molding larger patterns and the use of floor rammers, clamps, wedges, pinchbars and methods of rolling over and setting larger cores.
2. Core making.
   The uses of cores, different kinds and methods of making. A study of core sands, binders, mixtures, core machines and baking ovens. Making and baking cores of different shapes and sizes, venting, pasting, blacking, and finishing.
3. Cupola Work.
   Preparation of cupola for a heat by chipping out, daubing, lining, making bottoms and trough, building breast, weighing out and selection of iron and coke for the charges, use of fluxes, lining and drying ladles, laying of fire, placing of bed and successive charges, use of cupola tools in tapping out, stopping up, skimming and pouring.
4. Brass and Aluminum Foundings.
   Talk on the brass furnace, melting and mixing brass and aluminum, fluxes, and the use and care of crucibles, tongs, and materials.

CEMENT WORK

Aims of this course are to teach the fundamental principles involved in concrete construction, to make a set of projects involving the knowledge of a variety of ways of making and finishing concrete, to develop skill and accuracy in the handling of materials, to teach the use and proper care of the necessary tools about the work, and to show the methods of presenting the subject to others. The course is especially adapted for work in agricultural schools.

1. Section of sidewalk.
2. Section of curb and gutter.
3. Mounting block.
4. Section of floor with drain.
5. Troughs—hog, chicken.
6. Posts—fence, hitching.
7. Building block.
8. Simple steps.
9. Roller.
10. Garden pottery:—Jar, vase, paneled box, urn.
11. Drinking fountain.
12. Pedestal.
13. Bench or small bridge.
14. Baluster.
15. Stucco applications.



ELEMENTARY BRICKLAYING

Elementary bricklaying is designed to cover the problems of actual construction in a professional manner so as to be of assistance to teachers of either manual training or vocational schools. Shop talks, shop mathematics, applied design, assigned readings and reports on same, together with discussions, make up in part, the work of the course. The outline is in terms of projects made and comprises.

1. Corner of 4" wall, running bond. Struck joints, involving, mixing and spreading of mortar and proper method of laying brick.
2. Corner of 9" wall, American bond, struck joints, followed by 13" wall of the same bond.
3. Corner of 9", Flemish bond, struck or gauged joints.
4. Corner of 9" wall, English bond, struck or V—tuck joints.
5. Corner of 9" wall, Dutch bond, struck or raked joints.
6. Corner of 9" wall showing footing or 13"x17" pier on footing.
7. Hollow wall 10" or 14" with 2" air chamber, header or strap ties.
8. Hollow shaft or flue 16"x21", supplemented by double flue in basement wall or corner flue in first story wall.
9. Single Octagonal Corner - 9" wall.

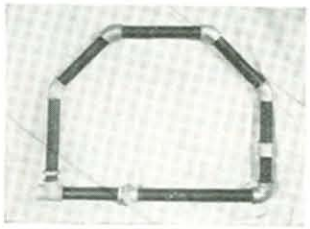
ADVANCED BRICKLAYING

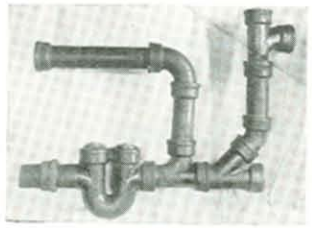
This phase of the work covers the more advanced details of construction which go to make up the complete structure. After the essential details are made, a number of original designs may be built involving a combination of suitable details in building construction.

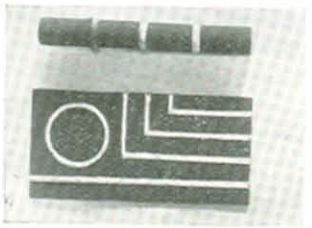
1. 4" Veneer on frame construction.
2. 8"x12" flue having plain top.
3. 12"x16" flue having crown top.
4. 16"x16" flue having beehive top.
5. 16"x16" flue having panel top.
6. Brick steps. Porch entrance.
7. Octagonal bay containing window frame.
8. Segmental arch—rowlock.
9. Semi-circular arch rowlock.
10. Segmental arch - bonded gauged.
11. Semi-circular arch—bonded gauged.
12. Combination jack and segmental arch.
13. Intersecting arches.
14. Groined arches.
15. Dentiled cornices.
16. Cornice with geometrical design.
17. Ornamental pilasters.
18. Flat or jack arch.
19. Quoined arch bands intersecting.
20. Quoined arch courses intersecting.
21. Gambrel roof gable.
22. Fireplace design.
23. Ornamental panel design.

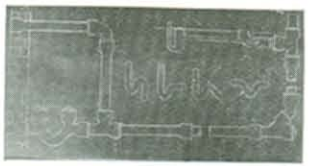
ELEMENTARY PLUMBING

Teachers of manual training are given an acquaintance with the plumbers' problems in order that a better idea may be had of general industrial conditions and better provision made to meet these conditions in manual training courses. The work is largely practical shop work supplemented by lectures covering plumbing, heating and gas fitting. The school is well equipped for practical instruction and constant additions are being made to keep equipment up to date. The first part of the course is covered in the elementary course during the Junior year.









1. Iron Pipe.

   Cutting and threading of iron pipe, using different types of cutters, stocks and dies of solid and adjustable pattern, followed by use of reamer and taps.

   Cutting and fitting according to plan and measurement with the more common fittings is followed by exercises illustrating the use of the union, right and left coupling, and the running thread and lock nut, as methods of connecting lines of pipe.

2. Soil Pipe and Fittings.

   Used in house drainage work for soil, waste and vent stacks with the proper fittings. The making of caulked joints as used by plumbers and the cutting, fitting and joining of stacks and branches into lines of soil pipe with vertical and horizontal joints.

3. Soldering.

   The use and care of the soldering iron and advantage of different shapes for certain work. Straight and angle seams are followed by the lining of sinks and tanks. Pipe soldering includes the making of cup, overcast, and blind joints. The heats of the iron, tinning, and best solders are points thoroughly covered and made plain.

4. Theory.

   Lectures cover that part of a complete installation that school shop work may not find possible, including: Source of water supply, water softening and filteration, street mains, service pipes, house supply, installation of fixtures, house sewer, main sewer in the street to its outfall, or sewage disposal plant.

ADVANCED PLUMBING

Students who have taken elementary plumbing are given opportunity in the senior year to begin specialization in plumbing as one of the building trades. The beginning of the course is a review of the elementary plumbing and leads from that to the wiping of joints and the erection of plumbing fixtures.

Practical Work.

The course begins with a review of the cutting, threading, and fitting of iron pipe and the making of iron pipe frames and racks.

More advanced work in soil pipe involves the running of drains and the erecting of stacks for waste and vent lines.

The wiping of joints with their preparation, a study of proper heat of the metal, making of wiping cloths and setting up of the joints enables the student to continue this line of work by himself, in time becoming proficient in wiping all the joints used.

Fixtures are set up and installed complete, with waste, vent, supply, and circulation pipes.

Theoretical Work.

Plumbing fixtures and connections are illustrated and by means of charts and diagrams the proper connections are shown, comparison with good and bad installation making clear the reason why. The water, sewer, and gas mains in the street are shown, methods of connecting with the main and the branches that lead to the house, the house plumbing in detail, involving discussions on traps and venting systems, styles, quality, appropriateness, and cost of fixtures, makes possible a thorough understanding of this important branch of house construction. In disposing of household waste the dangers of the cesspool are shown and the value of the septic tank method of disposing of sewage made plain.

Planning the plumbing for bathroom, kitchen, and laundry, economic arrangement, — safeguards against freezing, making the plumbing noiseless, and the expense of installation are thoroughly covered in these talks.

The water supply from either main in street or house tank, the hot water from range boiler or from automatic and instantaneous heaters with the problems in the domestic water supply are clearly explained.

The manufacture of material used in plumbing construction such as pottery, enameled ware, sheet lead and lead pipe, the making of iron pipe and fittings show many interesting processess and are the subject of instructive lectures.

Heating of buildings by means of steam, hot water, the vacuum system, and the warm air furnace, with heating values of the different methods and comparative costs are of interest to either teacher or prospective house owner.

Installation of vacuum system of house cleaning, costs, advantages, fixtures, and types of installation are indicated.

SPECIAL SHOP WORK

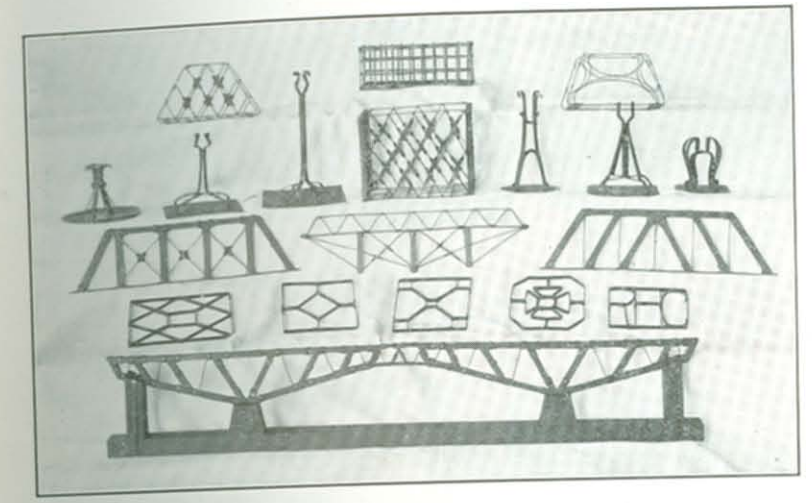
This course consists mainly of four lines of work,—whittling, tinsmithing, bent iron, and home repair work. The purpose of the course is to give students an acquaintance with the manipulation of the tools and materials used in these lines of work and to show some of the limitations and possibilities of each of these lines of work in the public schools.

Whittling.

1. Seed marker,—laying out, whittling straight with grain, and at an angle.
2. Pencil sharpener,—gluing on sandpaper.
3. String winder, - more difficult whittling at an angle.
4. Shipping tag,—use of compass and auger bit; whittling to curved line.
5. Glove mender, laying out and whittling taper on four sides; whittling to round form.
6. Paper knife,—laying out octagonal handle; whittling irregular curves in forming blade.

Tinsmithing.

1. Processes involved,—laying out, cutting, folding, soldering, wiring, riveting.
2. Tools used, soldering furnace, soldering coppers, riveting hammers, snips, wiring machines.
3. Materials used, solder, gasoline, rosin, acids, rivets, tin.
4. Projects made, - boxes, trays, cups, measures, funnels, dust pans.



Bent Iron Work.

1. Square mat,— making drawing, laying out, cutting iron, shaping, fitting, clinching binders.
2. Candlestick or post card holder,—designing, laying out and cutting pieces, bending to pattern, binding.
3. Bridge truss work, drawing, making wooden framework, cutting pieces, bending, fitting, binding, painting.

Home Repair Work.

1. Refinishing chair,—scraping, sanding, applying ground color, applying varnish stain.
2. Chair caning exercise,— laying out and making frame, running vertical, horizontal, and diagonal stands, binding.
3. Key fitting,—taking lock apart and noting construction, filing and fitting key.
4. Glazing window, —cutting glass to dimensions, setting glass in sash, puttying.
5. Rope tying and splicing; sharpening axes, skates and knives, this work is explained and carried out as far as time permits. Its importance in public school work is considered.

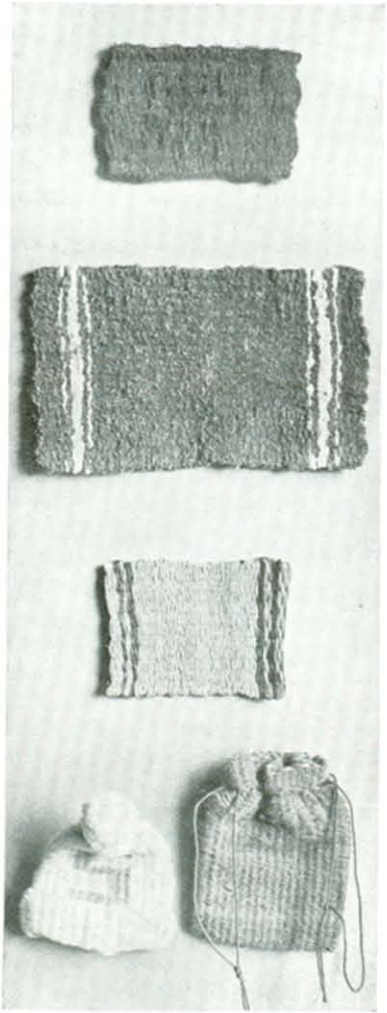
PRIMARY HANDWORK

Through the work of this course manual training students are enabled to see where and how a foundation in constructive handwork may be made. Students are prepared to teach or supervise this work in such a way that they in turn can give in the first four grades a kind of work which actually prepares the children for the more formidable manual training in the grammar grades. Many suggestions are given as to methods of teaching children, how best to interest them and get in touch with child nature. The problems of the supervisor, courses in the various subjects, suitable equipment, sources of supplies, are all considered, so that the student is caused to think of the business side of the work as well as the professional side.

Paper and Cardboard Construction.

1. Book problems.
   - Folders for free cutting.
   - Portfolios - single folded paper, straw board cloth covered.
   - Note Book Covers—covered, one and two piece covers.
   - Paper Files for pocket and desk use.
   - Pamphlets—for various purposes, kinds of sewing, ways of folding.

2. Box Problems.
   Open Boxes – corners lapped, reinforced with stay tape.
   Folding Boxes—made from one piece of material.
   Covered Boxes—various materials, fastenings, lining, covering.
   Sliding Boxes—fitting of case and cover.
3. Card Problems.
   Mounts—for pictures and drawings.
   Book Marks—cutting, decorating.
   Post Cards—cutting, ornamenting.
   Shipping Tags—cutting, gluing.
4. Envelope Problems.
   Mailing Envelopes—working from dictation.
   Filing Envelopes—different uses, work from drawings.
   Envelope Files—flat and book.
   Paper Sacks—flat, with folds, commercial sacks.



Weaving.

1. Small Mat (4"x6")
   Making cardboard loom, stringing warp, weaving, finishing.
2. Small Rug (6"x9")
   Wooden loom, stringing warp, designing border, weaving, weaving border, finishing.
3. Raffia Mat (4"x6")
   Making of cardboard loom, stringing linen warp threads, weaving body and colored border.
4. Semi-circular Bag, Marble Bag, Doll's Tam O'Shanter, Stocking Cap, Sweater, or Hammock.
   Students choose one of these, problems, make cardboard loom, string warp, weave and complete problem.

Basketry.

1. Coiled Mat (Strap Stitch)
   Preparing reed, starting center, wrapping reed with raffia, the stitch, finishing.
2. Raffia Basket (3" in diameter)
   Selecting stitch, starting like mat, shaping basket, design or border, handle.

3. Reed Mat (5" in diameter)
   Splitting spokes, starting center, with raffia, weaving with reed, finishing edges.
4. Reed Basket (Not over 5" in diameter)
   Number four spokes not split, starting with number two reed, weaving, finishing edge.

Clay Work.

1. Type Forms and Applications in Solids.
   Cube and Prisms—boxes, books, buildings, familiar objects.
   Sphere and Cylinder—apples, oranges, football, barrel, bottle.
   Cone and Pyramid—bell, tower, grainstack, lighthouse, tree forms.
2. Poses.
   Children—proportion, rough sketching with clay details.
   Animals—pets or familiar animals, study of form, securing shape, finishing details.
3. Pottery.
   Small Bowls—making ball, cutting into hemispheres, shaping bowls.
   Dishes – building by pieces.
   Vases—rolling coils, forcing coils together, shaping, smoothing.

ELEMENTARY PRINTING

The plan of this course is to give to students an opportunity to become familiar with the processes of printing and to give as much practice in the various work as the size of class and and length of period permit. After composing a job, the students make it up to the size and shape required, lock it in a chase for the presses and make it ready on one of them. When it is ready, the stock is run through and printed. The work is arranged so that students move regularly from one kind of work to another, thus securing a good acquaintance with printing. The problems of printing handled in class are given in the following outline:

1. Paragraphs of Straight Composition.
   Involving the proper holding of the composing stick, setting it to given lengths, setting the type in place, spacing and justifying lines of type. Copy for these paragraphs varies in nature but as far as possible the work is incorporated with other parts and becomes a finished product.
2. Outlines.
   Academic and shop work furnish the copy for this kind of composition. Hanging indentions and setting of longer lines are the new steps.
3. Display Composition.
   Students design and compose small jobs that are used as bulletin notices, announcements, tickets, labels, or small posters. The work is done with attention to the proper proportion, balance and center of interest of each piece of display composition.
4. Leader and Rule Work.
   The use of leaders and various kinds of rules is given to students in exercise work and in the setting of small record blanks and other forms.

ADVANCED PRINTING

Because of the increasing popularity of printing as a subject in the manual arts and vocational work in public schools, students are urged to take the advanced course if possible in order that they may have a better grasp of the work. The processes in the elementary course are continued but with added difficulties and demands for greater accuracy. New processes, such as folding and stapling are introduced. Students are given opportunities for specialization. The problems made in this work are as follows:

1. Booklets.
   Composition, correcting in galley, making up pages, correcting pages, imposition of pages, making ready, feeding (with and without slip sheeting), folding, stapling.
2. Posters.
   These problems are designed and worked up by students from the rough and incomplete copy. Attention is given to good design and attractive qualities of the display. Athletic posters, announcement of contests, and notice of entertainments given by the students furnish copy that makes this problem very practical.
3. Letter Heads and Envelopes.
   Sizes and kinds are considered. Simple and difficult arrangements are carried out. Envelopes are set up to match letter heads. The imposition and press work for envelopes are given.
4. Business Cards.
   Different arrangements on same size, different sizes, appearance suited to use, types for this kind of work.
5. Decorative Circulars.
   This work is to give students an opportunity to work with borders and ornaments, and to print work with color harmonies.
6. Advertisements.
   Type for this work, effective wording as well as attractive display, psychology involved in advertising.
7. Leader Jobs.
   Different from those in the elementary course in that words and groups of leaders alternate across a line. Students are required to produce vertical alignment of the words of one line with those of another line.
8. Rule Jobs.
   Forming some of the most difficult, yet most interesting problems that occur. Report blanks, ledger records, order blanks and like forms needed in the different departments furnish unlimited copy for this work. Small forms are built up with horizontal and vertical rules properly adjusted. Larger and more difficult forms are built up with horizontal rules and type in one form and vertical material in another form. The special press work for this printing is considered.
9. Tables.
   Formulas, estimating, sizes of materials and records of irregular rule work are included in this work. Special care is required to make an accurate form with its many hundreds of pieces of material.

PHYSICAL TRAINING

Regular work in the gymnasium and natatorium is taken throughout the manual training course unless students are excused by the director. Four periods each week are given to exercises, games, swimming and normal gymnastics. The athletic association is given charge of athletic activities, and manages basket ball, base ball and foot ball teams.

SCHEDULE OF MANUAL TRAINING CLASSES

JUNIOR YEAR

Psychology and Pedagogy
History of Manual Training
Literature of Manual Training
Industrial Economics
English
Class Talks
Freehand Drawing
Manual Training Design
Elementary Mechanical Drawing
Projection Drawing
Elementary Architectural Drawing
Elementary Woodwork
Joinery
Elementary Carpentry
Elementary Wood Turning
Elementary Wood Finishing
Saw Filing
Elementary Forging
Elementary Machine Shop Work
Elementary Bricklaying
Elementary Plumbing
Special Shop Work
Primary Handwork
Elementary Printing
Physical Training

SENIOR YEAR

Organization of Manual Training
Observation and Practice Teaching
Class Talks
Machine Drafting
Advanced Architectural Drawing
Upper Grade Woodwork
Pattern Making
Advanced Carpentry
Mill Work
Cabinet Making
Advanced Wood Turning
Advanced Wood Finishing
Advanced Forging
Advanced Machine Shop Work
Mill Wrighting
Cement Work
Advanced Bricklaying
Advanced Plumbing
Advanced Printing
Physical Training

HOME ECONOMICS DEPARTMENT

COURSES OF STUDY FOR 1914-1915

Domestic Science and Domestic Art are terms that are applied to the lines of work here grouped under Home Economics. The term is not satisfactory, but is used because it is more generally understood to include the full range of subjects than either of the others. The scope of the subject matter here outlined covers the following points: Foods and their uses, cookery, general science, sewing, millinery, textiles, drawing and house decoration, emergencies and home nursing, household management, and professional subjeets.

FOODS AND COOKERY

Studies in this group deal with nutritive and economic values of foods and the methods of preparing them for use. To this end a knowledge of the requirements of the body, of processes of digestion, of the structure, composition, digestibility, absorption, availability, market appearance, and price are necessary. The system of production of food is considered in so far as it affects the cost and nutritive value of food when it reaches the consumer. Cookery involves the study of the effect of heat variously applied, upon the food principles, of adapting method of cookery to the material in hand to secure the highest return in digestibility and food value with reasonable expenditure of time and labor.

The courses in cookery aim also to develop in each student a high order of technical ability and high standards of order and cleanliness in work. The subject matter is well organized and presented logically, and the practical lessons are presented in sequences according to the orderly development of the subject matter involved, the degree of skill in manipulation required, the availability of food materials and the probable application of the lessons to teaching.

The subjects of the junior year in this group, i. e., food study and cooking, are prerequsite to the cooking and dietetics of the senior year. Credit in these courses is allowed for courses taken in other schools when those courses prove on examination to be the full equivalent in subject matter and technical work of the courses given here and are planned with similar phases of emphasis, particularly emphasis on the professional phase.

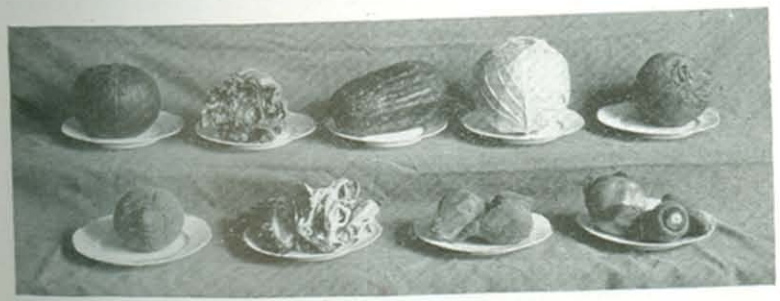
The professional phases of these courses are presented as an integral part of the work. The sequence of subject matter and practical work, methods of presentation of the subject to classes, ideals, plans and devices in class management are studied with discussion, criticism, and comparison of concrete examples taken from the class work in the institute classes. The modification of a course to meet the needs of different schools, to meet the needs of pupils from various types of home environment, is considered, the many ideas involved to be later summarized and organized in the course on General Organization and Management.

FOOD STUDY

A complete and systematized study of all foods shows composition-tion, structure, nutritive ratio, digestibility, cost, and place in the diet. It includes a study of the chemical and physical changes which take place in foods during cooking and the effect of various temperatures on the digestibility and food value of the varions foods. Work in food study is closely correlated with the work in junior cookery so that one complements the other.

The place of food Study in the public school curriculum, its correlation with other subjects, and the methods of presenting the work in public school classes are discussed.

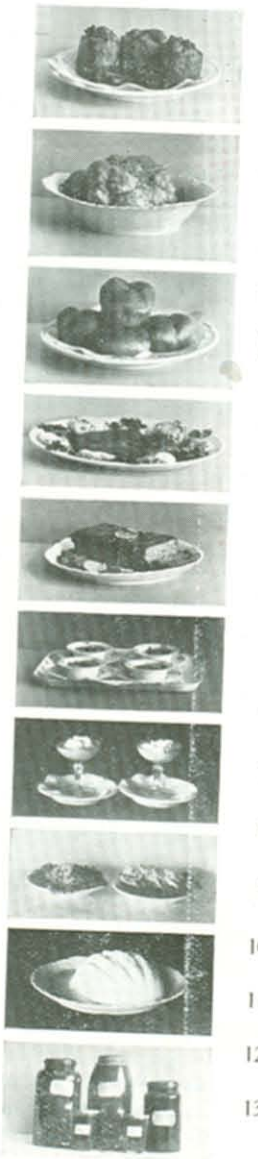
1. Cell.
   Definition, physical structure, chemical composition, functions, types.
2. Tissues.
   Classification, cell structure.
3. Metabolism.
   Digestion, absorption, circulation, assimilation, excretion.
4. Foods.
   Definition, classification, digestion, absorption, elimination, storage, source and functions of each group. The classification of foods is that used in food chemistry.
5. Vegetable Foods.
   Classed as roots and tubers, cereals, legumes, green vegetables, fruits.
6. Animal Foods.
   Meats, fish, poultry, eggs, milk and its derivatives.



Each food is studied in detail varying with the different ones, but in general covering: kind, cultivation or growth, distribution, preparation for market, transportation, care in the home, market products and prices, chemical composition, digestibility, fuel value, dietetic value, cookery, uses.

ELEMENTARY COOKERY

Elementary cookery is especially designed to meet the needs of those planning to become teachers of domestic science. The student is trained, therefore, not only to obtain good results in housekeeping and cookery, but also to think and work with a view to presenting the subject matter to others. Foods are studied and tested to learn the effect of heat and moisture upon them, and the principles of cookery thus determined are applied in the preparation of simple foods and combinations of food. It is planned to secure a thorough understanding of the theory and method involved in the cooking of the more fundamental foods, rather than to cover the whole field of cookery. Sufficient repetition of processes is given to insure a fair degree of skill in the manipulation of utensils and materials. Attention is given to the systematic organization of the school kitchen and its management. The cost of foods is studied in relation to the income of the home and of the school, and cost of the lessons is worked out to serve as a basis for comparison.



1. Simple Carbohydrate Foods.
   Potatoes, cereals, tapioca.
2. Seasonable Vegetables.
   Tomatoes, spinach, root vegetables, egg plant, beans.
3. Preparation and Use of Dried Fruits and Vegetables.
   Peach, pear, apricot, prune, beans, peas.
4. Study of Batters and Doughs.
   Popovers, griddle cakes, muffins, cornbread, biscuits, breads, cakes, plain pastry.
5. Selection and Cookery of Meats and Poultry.
   Beef, veal, mutton, lamb, pork, salt and smoked meats.
6. Fish.
   Fresh, canned, salt.
7. Eggs, Milk, Cheese.
   Combination of eggs, milk and cheese.
8. Puddings.
   Custards and those with custard basis, gelatine, batter.
9. Salads.
   Fruit, vegetables, meat.
10. Beverages.
    Tea, coffee, cocoa.
11. Frozen Desserts.
    Ices, sherbets, creams.
12. Serving Simple Meals in Laboratory as for Grade Work.
    Planning, laying of table, waiting and serving.
13. Canning and Preserving.
    Methods, principles involved, practical work in the simple processes of canning available fruit.

DIETETICS

The purpose of this course is to present the fundamental principles of human nutrition and their application to the feeding of individuals, families, and larger groupes under varying physiological, economic, and social conditions. The course aims to relate and apply the principles given in the study of foods and their preparation, physiology, and physiological chemistry. It includes recitation and laboratory work and is designed to be used as a basis for practical work in dietetics as well as for organizing and teaching the subject in the high school.

1. Review of chemistry and physiology of digestion.
2. Metabolism of proteins, fats, carbohydrates.
3. Determination of fuel values of foods.
4. The 100-calorie portion as a unit and the determination of the weight of different foods yielding 100-calories.
5. Modern dietary standards and their practical application.
6. Computations of dietaries fulfilling the energy requirement at definite costs.
7. Preparation of meals in dietaries worked out for special conditions and comparing the theoretical quantities of food with the actual quantity of food consumed.
8. Protein metabolism and protein requirement. Nutritive ratio of foods and dietaries.
9. Mineral metabolism—study of investigations and present theories.
10. Feeding of infants and children, underlying principles and their applications.
11. Diet in diseases with especial reference to disorders of nutrition and metabolism.
12. Planning and cooking of dietaries for especial diseases and estimation of their calorific value.

ADVANCED COOKERY

This course gives practice in several phases of cookery, in selection and marketing of foods, making menus and serving meals. Especial attention is paid to the economic consideration of wise expenditure of time and money in food preparation. The processes carried out are more elaborate than in the junior year and self-reliance on the part of the student in the plan and execution of her work is encouraged.

The work includes food preservation, food preparation, study of the menu, of table service, individual work in the serving of meals, large quantity cooking and serving, the giving of demonstrations.

1. Food Preservation.
   Canning fruits, making preserves, jelly, pickles, experiments with different methods of canning fruits.
2. Food Preparation.
   Preparation of vegetables, fruits, meats, breads, cakes, pastries, salads, hot desserts, ices. The preparation of these is more elaborate than in the Elementary Cookery. Principles of cooking reviewed and applied independently,—comparison of different methods of work, value of form, computation of cost, including initial cost of material plus value of time and labor involved in preparation.
3. Invalid Cookery.
   Gruels, beverages, broths, eggs, breads, laying of tray.
4. The Menu.
   Planned to meet physiological needs, with reference to availability of foods in the market, cost of food and economy in labor.
5. Marketing.
   Review of system of production as it influences cost of food, time of marketing and selection of food, methods of purchase, co-operation of consumer and retail merchant, basis of selection, methods of accounting.
6. Table service.
   Forms, standards, controlling factors, cost of service, social values of accepted standards, adaptation of standard forms to existing conditions.
7. Cooking and Serving Meals.
   Application of subject matter above in individual work on typical problems.
8. Large Quantity Cooking and Serving.
   Class work in preparation and serving of banquets for large numbers.
9. Demonstration Cooking.
   The use of cookery to illustrate the lecture on principles and processes of cookery and the subject of foods; discussions, individual exercises.

APPLIED SCIENCE

Science courses here outlined are not designed to give the student a comprehensive knowledge of the subjects studied and are not detailed science courses in the usual sense of the term. Only such phases of the different subjects are dwelt upon as find application in practical home management, and such fundamentals are taught as are necessary to an understanding of these applications. The aim in teaching is not professional but to give a basic understanding of the relation of science to the practical affairs of the home.

PHYSIOLOGY AND HYGIENE

This course is planned for the purpose of teaching (a) the structure and function of the body, organs and tissues, (b) personal hygiene and individual health, (c) public hygiene and general health, (d) physiology and hygiene in relation to the school child.

The subject of Sex Physiology and Hygiene is given in a series of lectures by the instructor. Organization and presentation of subject matter and vital present-day school problems of hygiene are discussed.

1. Organs and Tissues.
2. Chemical Composition of the Body.
3. Digestion.
   Mouth, throat, oesophagus, stomach, intestines—foods and food habits, diseases of the intestinal tract.
4. Absorption.
5. Circulation.
   Blood, heart and blood vessels, path of circulation—diseases of the blood.

6. Respiration.
   Nose, pharynx, trachea, lungs, mechanism of respiration and nervous control—diseases of the respiratory organs.
7. Excretion.
   Kidneys, skin—diseases of same.
8. Skeleton Structure.
   Injuries to joints and bones.
9. Muscle.
   Structure, use, exercise.
10. Nervous System—General Anatomy.
    Care of and diseases of nervous system.
11. Special Senses.
    Structure, care.
12. Control of Public Health.
13. Special Physiology.
    a. Physiology and hygiene of female reproductive organs.
    b. Prophylaxis of social diseases.
    c. Sex education.

GENERAL CHEMISTRY

This course deals with the theories and processes fundamental to chemical science. It serves as a preparation for the succeeding courses, being, at the same time closely related to everyday life by many applications. The most important points are reinforced by laboratory experiment.

1. Chemical change, elements and compounds, equivalents and atomic weights, symbols and formulas.
2. Oxygen and oxidation, hydrogen and acids, the properties and laws of gases, the kinetic-molecular hypothesis and its relation to the gas laws.
3. Water: properties, purification, city water supply, solutions, freezing mixtures, osmotic pressure.
4. Chlorine and bleaching, bromine and iodine.
5. Valence and constitutional formulas.
6. Dissociation in solution and its application to electrolysis, depression of the freezing point, osmotic pressure, strength of acids and bases, reaction in solution.
7. Sulfur, sulfur impurities in fuel gas, sulfur dioxide and bleaching, sulfuric acid.
8. Nitrogen; supply in the soil, ammonia, artificial ice, nitric acid and the nitrates.
9. Phosphorus, matches and 'phossy jaw', phosphoric acid and the phosphates.
10. Carbon; allotropic forms, coal, charcoal, carbon dioxide and ventilation.
11. Silicon and the silicates (mica, clay, sandstone and granite) Boron, boric acid and borates.
12. Potassium and sodium, salts of sodium; sodium chloride, its manufacture and impurities, carbonate (washing soda), bicarbonate (baking soda), baking powders.
13. Magnesium and calcium salts; limestone, lime, mortar, cement, bleaching powder, plaster of Paris, glass, hard water, the softening of water.
14. Iron, aluminum, copper, tin, lead, and zinc as to their uses in the household and their fitness for such uses.

FOOD CHEMISTRY

Food chemistry is essential to the understanding of food materials and the reactions which occur in their preparation. A study of substances of simpler structure which are not foods but are of practical use in the home, serves as an introduction.

1. Petroleum and its products, illuminating gas and the products of coal tar, turpentine extractives.
2. Halogen substitution products; chloroform, iodoform.
3. Alcohols and fermentation, phenols.
4. Ethers.
5. Aldehydes and disinfection, acetone, quinones and dyes.

6. Acids of fruits and vegetables, vinegar.
7. Esters, the essential oils and flavoring extracts.
8. Fats: their properties and constitution, hydrolysis, hardening of vegetable oils, rancidity, emulsification, soap-making, the solvents of fats and the determination of the fat content of a food as nuts.
9. Carbohydrates: the simple sugars, glucose, fructose, the determination of glucose with Fehling's solution, cane sugar, milk sugar, the inversion of sugars, starches, dextrin, cellulose, glycogen, gums, the chemistry of bread-making.
10. Organic substances containing nitrogen, amines, amides, amino acids, the synthesis of peptids.
11. Protein, properties and classification, the protein content of foods.

CHEMISTRY OF NUTRITION

Prerequisites to this course are the ones in food chemistry and physiology. The aim is to show the chemical reactions within the body and the results of these reactions.

1. Human body.
   Gross structure; internal structure of respiratory organs, alimentary canal, circulatory and lymphatic systems; cell structure, composition, necessary foods; tissues and secretions, blood, various fluids, muscles, nerves, bones, fat.
2. Foods Required in the Body.
   Process of digestion.—Mouth digestion provides mastication, solution of foods, diastatic action, and involves a consideration of the salivary glands, their kinds, location, secretions, and of saliva, its composition, properties, diastatic action, limitations, agents retarding.—Stomach digestion includes a study of the glands of the mucous membrane, kinds, occurence, character of secretion; secretions, their compositson, conditions exciting flow, influence of blood, etc; action of juices, conditions retarding and promoting rapidity: special action of pepsin, rennin, gastric lipase.—Intestinal digestion includes a similar study of the pancreatic juice, intestinal juices, and bile.
3. Paths of absorption of digested foods.
   Lacteal or lymphatic systems as carrier medium, necessary conditions, foods absorbed, changes during absorption; the portal system as carrier medium, process, foods carried, changes.
4. Metabolism.
   Constructive, conveyance of foods to cell, importance of capillaries, building up of absorbed foods into living tissues; destructive decomposition of foods and liberation of energy, disposal of waste materials.
5. Products of metabolism.
   Tissues and secretions, excretory products, source of muscular energy, heat equivalent of some common foods.

MICROBIOLOGY

The study of micro-organisms and their effects is applied to household management, sanitation, public health, and personal hygiene. The particular phase of biology emphasized is bacteriology. Emphasis is laid on the bacteriological principles involved in the care and preservation of food, investigation of milk and water supplies, disinfecting and sterilization, home nursing and the prevention of infectious diseases.

1. Plant Physiology.
   Nature and relation of an organism; composition and structure of a living cell; study of a one celled organism; the processes of respiration, digestion, growth and reproduction.
2. Plant Classification.
   The place of bacteria and other organisms included in a course of microbiology.
3. Mushrooms.
   Micrology; distinction between poisonous and edible varieties; cultivation.
4. Ergot and Rusts.
   General nature; economic importance; prevention.

5. Molds.
   Morphology; growth and reproduction; types; use of molds; how to control them.
6. Yeasts.
   Structure of yeast cell; reproduction of yeast; yeast types, conditions for growth; commercial varieties of yeast and their value.
7. Bacteria.
   Discovery of bacteria; methods of study, including preparation of culture media, sterilization, disinfectants, and the technic of making pure cultures.
   Structure, composition and mode of development of bacteria; effect of physical and chemical agents upon bacteria.
8. Cleanliness in the home.
   Bacteria in relation to preservation of food; bacteriology of milk and its products.
9. The nitrogen cycle.
   Bacteria in the arts and industries. Bacteria of air, soil, and water; relation to disease, immunity.
   Pathogenic bacteria and protozoa.

PLAIN SEWING

Plain sewing consists of lessons on the making of a complete set of undergarments,—corset cover, drawers, night gown, and petticoat, drafted to measure. For each garment the following points are considered:

1. Selection of materials.
2. Preparation of materials.
3. Testing pattern.
4. Placing pattern on goods.
5. Cutting.
6. Seams.
7. Closing and fastenings.
8. Finish of neck, yoke, band.
9. Finish of bottom.

MODEL SEWING

Aim of the course is to teach the fundamental principles involved in hand sewing, to make a set of models involving the various steps in sewing which may be used as illustrative material in teaching, to develop skill, neatness, and accuracy in the handling of materials, to give student correct methods, to indicate ways of presenting problems.

1. Canvas Work.
   Sampler: various stitches, as running, basting stitching, overcasting etc.
   Original article:—application of above stitches to small articles adapted to ability of a child.
2. Hems.
   Paper and muslin models: – folding, basting, and hemming.
   Square and mitred corners: – damask hem; hems for flannel; hemstitching, .

3. Bands and Ruffles.
   Sampler:—cutting material; gathering and setting in band; application to small apron
4. Repair Work.
   Darns:—stockinet; cloth —to show straight, bias, corner, and patch darns on plain and plaid material.
   Patches:—hemmed, overhanded, flannel, matching of stripes.
5. Work on Flannel.
   Patches:—flannel —catchstitched to position.
   Seams:—plain; catchstitched; open; felled; bound —using binding ribbon.
   Fancy stitches:— feather; coral; chain; blanket.
6. Plackets.
   Hemmed; bound; bound and faced.
7. Fastening.
   Buttonholes:—preparation —cutting, stranding, overcasting; working—fanned ends, barred ends.
   Hooks and eyes; buttons; eyelets and loops; tape

8. Trimmings.
   Tucks; ruffles; rolled hem.
   Lace and embroidery insertion and edging.
   Fagotting:— an application made of the above in the plain sewing course.

DRESSMAKING

The purpose here is to teach the art of dressmaking and the use of a system of drafting by which patterns and designs are made, the designing of ordinary garments; the use of line, proportions, color and adaptation of materials; and to develop neatness, accuracy, self-reliance and high ideals of work. Lectures and class discussions are held on artistic and appropriate dress, and the hygiene and economics of clothing. Professional work on the planning of courses for public school work, adaptations for different conditions, and presentation of subject matter are included in the course.

1. Shirt waist and sleeve drafted, to learn use of drafting system. Shirt waist patterns designed in paper. Tailored shirt waist designed and drafted to measure, and made of wash material.
2. Skirts drafted and designed according to prevailing styles. Wash skirt made to measure, with special emphasis upon fitting, different finishes of seams, plackets, facings, and waist line.
3. Wool dress made from drafted pattern, emphasizing the proper handling of materials, selection of trimmings and finishings.
4. Tailored morning dress made from drafted pattern. Selection of material and design appropriate to use, considered.
5. Lingerie dress of voile, swiss or lawn made from commercial pattern, with instruction in the use of such patterns.

ART NEEDLE WORK

Art needle work is planned to give training in the application of a knowledge of design and skill in fine needle work for the finishing or decoration of articles of clothing or house furnishing. The different lines of art needle work are considered under the heads given below and worked out upon articles chosen by the students.

1. Characteristics of design suited to various lines of needle work.
2. Design.
   Adaptation to particular line of needle work.
   Articles suited to kind of finish or decoration.
   Materials suited to finish, decoration, design.
3. Study of materials.
   Source, selection, combination, cost.
   Needle work stitches and finishing.
4. Kinds of work.
   Crocheting, knitting, ornamental darning, applique, cross stitch, Swedish weaving, hemstitching, drawn work, French work—scallops and dots, eyelets, initials, cut work.

TRADE DRESSMAKING

The aim of the course is to prepare teachers for trade dressmaking classes and to afford students an opportunity to acquire skill in the designing, planning, cutting, fitting and finishing of garments. Each student drafts, cuts, bastes, fits, makes alterations, and finishes waist linings, shirt waists, sleeves, and skirt models. Members of the class fit each other in working out the foregoing exercises. Trade work includes making of tailored skirts and waist suits, woolen and cotton dresses, silk, woolen, veiled and lingerie waists and gowns and any other suitable problems that may be brought to the school.

Lectures and class discussions accompany the practical work throughout the year. Some of the problems taken up are as follows: Advantages and disadvantages of drafted and commercial patterns; drafting in elementary and secondary schools; study of trade schools, their purposes, courses of study, results; planning courses of study for trade school classes, for example, shirt waist class, or plain sewing class.

1. Drafting waist linings, sleeves, skirts.
   Purpose of, direction for, drafting patterns, testing, seams, allowance, tracing, cutting.
2. Designing.
   Using foundation patterns, designing pleated, draped or fancy waists, sleeves, skirts, dresses, making paper, cambric or cheese cloth patterns of same.

3. Cutting.
   Placing pattern, pinning, marking, cutting, basting.
4. Fitting.
   Objects to be considered; elementary directions for normal and abnormal figures.
5. Finishing.
   Waist linings, i. e. seams, plackets, hooks and eyes, buttons, lining, belting.
   Sleeves, including seams, placket, cuffs.
   Skirts including seams, belt placket hems, plaits, and tucks.
6. Draping.
   Arranging in foundation linings, skirts, yokes, collars, sleeves, waists.
7. Costume Design.
   Study of lines and harmony; fabrics, suitability, utility, trimmings; designing for patrons.

TEXTILES

This course is planned to furnish such information as will enable the student to purchase and use textile fabrics wisely, both in the home and as a teacher of domestic art. To accomplish this the following phases of the subject are dealt with:

1. History of the Textile Industries.
   Spinning and weaving. The important periods marking changes in each industry are considered, showing how and why the industry developed from primitive up to the present time. Application of this knowledge is made to the buying of textile fabrics.
2. Classification of Textile Fibers.
   Sources, production, and characteristics of each, emphasizing those which give distinction to fabrics.
3. Manufacture of Fabrics from Four Leading Fibers.
   Cotton, flax, silk, and wool processes necessary to give an idea of how fabric is made, with special attention to those which affect wearing quality, cost, and use.
4. Knowledge of Fabrics.
   Names, prices, widths of standard makes of materials.
5. Adulteration.
   Reasons for it. Combinations of fibers commonly used. Legitimate and illegitimate adulteration; methods used; tests: (1) physical, or those which may be applied in the home or store, (2) chemical, in the laboratory and for which a knowledge of chemistry is desirable.
6. Professional.
   Factors entering into the selection of subject matter making courses of study for different kinds of schools; illustrative material—what and where obtained, making of sample charts.

MILLINERY

Designing, making, trimming, and decorating of fall and spring hats with a view to developing originality, invention, and skill are the main purposes of this course. Stress is placed upon the artistic side of the work by study of the harmony of color and line. The practical side is also taught by emphasizing economy in the utilization of old material by renovating and tinting. Distinction and individuality in the product are secured by the making of flowers, ornaments, and other trimmings. Suggestions for the adaptation of the work to high schools, and to continuation and trade school classes are made throughout the course.

1. Wire work for fall millinery.
   Bandeaux, stocks, buckles, frames. Design of frame, handling wire, cutting, fitting, and fastening.
2. Tinting and renovating materials.
   Gasoline, oil paints, dyeing, selection and use of colors.
3. Millinery stitches.
   Running, back, overcast, feather, button-hole, slip, catch, saddler's stab, lacing.
4. Folds.
   Milliner's and French.
5. Flower and bow making and trimming.
   Making of roses and violets; tissue paper bows, even and uneven loops, rosettes; use of silk ribbon, maline, and lace; making of buckles and cabachons.
6. Buckram frame.
   Designing of hats, shaping of material, finishing frame; covering, trimming, lining.
7. Street hat for spring millinery.
   Wire frame, covering, straw sewing, trimming, finishing.

DRAWING AND ART WORK

Lines of work include the subjects and modifications of subjects needed by the student to carry on practical applications of house planning, furnishing, use of design, use of color.

MECHANICAL DRAWING

A course of lectures and the making of drawings are included as a part of the regular work in preparation for teaching the household arts in public schools. A series of exercises is given to develop suitable technique and familiarity with drafting conventions, and these are followed by the making of working drawings of pieces of school equipment and layouts of school rooms. The course ends with the making of plans and elevations of small cottages and a study of building details and conveniences.

1. Lettering exercise.
   Giving special attention to the proper proportions of a suitable type of lettering for the making of working sketches and simple mechanical drawings.
2. Line exercise.
   Providing opportunity for practice with the various kinds required in common drafting usage.
3. Projection drawing
   Representing solid objects shown in three views and completely dimensioned.
4. Working drawing of stand.
   Designing pieces of furniture and putting dimensions upon details of construction.

5. Kitchen table.
   Making of drawing of table suitable for use in domestic science classes.
6. Storage cabinet.
   Determining desirable arrangements, study of construction, making of complete drawing.
7. School kitchen.
   Location of doors and windows, placing of furnishings, making of scaled architectural sketch of scheme.
8. Plan of cottage.
   Studying problem of house planning, determining size and shape of rooms, considering conveniences and constructive details, use of architectural conventions.
9. Elevation of cottage.
   Selecting type of exterior suitable for style of cottage, examination of exterior details, making of front and side elevations.
10. Interior wall arrangements.
    Adjusting paneling and other woodwork to use and attractive appearance, developing four walls of one room.
11. Two story frame house.
    Sketching plans and elevations for modest dwelling.
12. Perspective.
    Drawing in perspective to show more real appearance of objects.

DRAWING AND DESIGN

The aim of this course is to give the students an understanding of the underlying principles of good design and an ability to appreciate good design. It offers in sequence the principles of design and the essentials of color harmony.

The work is planned to meet the needs of the present day industrial training and especially emphasises problems in relation to domestic arts, such as: adaptation of forms to fill various spaces; changing proportions; adaptation of pattern to materials; manner in which materials condition treatment; various materials discussed with changes necessary for adaptation of a given pattern.

Design.

1. The Laws which govern constructive, pictorial and decorative design.
2. The application of such design to the various problems in Industrial Education.

Drawing.

1. The analysis of each problem is carried on with different mediums, so that a practical knowledge of drawing is obtained. The following mediums are used: pencil, water color, crayons, charcoal, ink, blackboard.
2. The practice and theory of color is worked out through the plant analysis for the purpose of composition and design.
3. Special attention is given to the relation between good design and color values, to the stitchery and craft problems.
   a. House furnishing: simple form and quiet color.
   b. Household linen: initials and monograms.
   c. Color combinations applied to dress.
4. A short course in artistic anatomy is given: also a sketch class from life, to enable the student to quickly sketch the human figure, to facilitate the work in costume designing and dress making.
5. Perspective is taught to enable the student to illustrate problems before the class by the delineation of cylindric or rectangular objects.
6. A thorough drill in parallel and angular perspective as applied to interiors and constructive drawings.

INTERIOR DECORATION AND FURNISHING

The course is taken up under two heads: first, the principles underlying good proportion and color harmony are studied; second the application of these principles to house planning and furnishing is made. The course is designed to enable the student to plan an attractive, comfortable house that may be built at a moderate cost; to apply artistic and economic principles in determining appropriate and artistic furnishings and decoration and to select from the house furnishings now on the market, such as wall papers, rugs, furniture, etc., the most artistic and the best for the money expended.

The professional side of the work will be considered throughout the course with the idea that the student may teach the work in high school.

House Planning.

1. Exteriors: location, building materials, architecture.
2. Interiors: first and second floor plans of a house not to exceed $4000 in cost.

Good Proportion.

1. Theory of proportion: balance, rhythm, harmony.
2. Application to a living room: breaking of wall spaces, arrangement of windows, doors, built in furniture and fire place.

Color.

1. Theory of color: the spectrum; grayed colors.
2. Color analysis. wall papers, rugs, wood work, hangings, and furniture is analyzed in color.
3. Color harmony, contrast and analogy, effect of light. Application of color scheme to the living room. Harmonious color schemes are worked out for other rooms, considering exposure, use of room, psychological effect of color.

Selection of Furnishings and Decorations.

1. Woodwork: construction, color, finished floors, standing woodwork and beams.
2. Wall coverings: plaster, oil paints, water paints, paper, cloth.
3. Hangings: window curtains, portieres.
   Experiments are tried with wall coverings and hangings in a model room.
4. Floor coverings: rugs, carpets, matting, linoleum.
5. Furniture: cost, construction and design. Stocks of furniture are studied in the shops. Arrangement of furniture is studied in rooms available for the purpose.
6. Pictures and picture hangings, bric a brac.

The Rooms of the House.

During the previous work the furnishing and decoration of a living room, dining room, and bedroom have been worked out by each student. The furnishing and decoration of the kitchen, hall, library, nursery and porch are taken up as class problems.

Refurnishing and Remodeling Houses.

PROFESSIONAL SUBJECTS

It is necessary that the students understand the professional as well as the practical and economic bearing of the subject. Many of the training possibilities of the various lines of work are emphasized in the regular course of instruction, attention being called to the mental processes involved, the specific training value, the organization of material, the presentation of subject matter, using the regular class work to illustrate processes. The actual organization and handling of the public school classes of different grades gives opportunity to acquire, at first hand, knowledge of the stages of development of pupils of different ages.

The professional work may be included in the following general topics: psychology and pedagogy, observation and practice teaching, a study of the organization and management of classes, and of the organization of courses of study and planning of equipment.

PSYCHOLOGY AND PEDAGOGY

See under Manual Training Outline of Courses for scope of work.

OBSERVATION AND PRACTICE TEACHING

See under same heading. Manual Training page 15.

GENERAL ORGANIZATION AND MANAGEMENT

The following course has as its aim the working out of the relation of the subjects of instruction included in a complete home economics course and the indicating of the peculiar training possibilities of each subject as well as the organization of practical information needed by a teacher n introducing or conducting the work.

1. History and status of Home Economics in schools.
2. Practical and educational purposes in its teaching.
3. Scope of the subject. Sciences – chemistry, physiology, biology, physics. Art – use of color, design, house decoration, designing of costume. Economics—relation of home to surroundings, social and industrial.
4. Place in course of study.
   Relation to other lines already taught, sequence of work as determined by psychological and physical principles.
5. Planning of courses of study.
   Influence of environment, development of pupil, possibilities of school system.
6. Organization of classes.
   Records, attendance, standard of class marking.
7. Presentation of subject matter.
   Preparation for lesson, lesson plan, preparation of materials, presentation, theoretical treatment, method of conducting, practical application.
8. Study of equipment; rooms.
   Plans, dimensions, furnishings – kinds, cost, where obtained.
9. Cost of maintenance.
10. The special teacher.
    Attitude toward other lines of work, relations with regular teachers, supervision and conduct of teacher's classes.

GENERAL SUBJECTS

Under this head are grouped subjects that do not logically fall under the other main headings.

EMERGENCIES AND HOME-NURSING

This course gives the practical treatment of simple ailments of the human body and methods of handling emergencies that may occur in the home, the school, or elsewhere.

1. The sick room.
   Location, furnishing, ventilation, care.
2. Beds and bed-making.
   Lifting and handling patient.
3. Baths and bathing.
4. Observation of temperature, respiration, pulse, administration of medicines.
5. Local applications.
   Plasters, poultices, blisters and other counter-irritants, hot and cold compresses.
6. Contagion and disinfection.
   Infectious diseases, modes of propagation, fumigation and disinfection.
7. Emergencies.
   Fainting, drowning, scalds and burns, frost bites, hemorrhage, sprains and fractures, poisons and antidotes.

8. Bandaging.
9. Study of diseases.
   Tuberculosis, typhoid fever, colds.

HOUSEHOLD MANAGEMENT

Household management furnishes an opportunity to assemble the numerous lines of instruction and fields of experience necessary to administer the affairs of a household, into one general course. The primay purpose of this line of work is to show the relations of science, art, economics, and their practical application.

Because of the scope of the subject and the necessity for little equipment in its teaching, household management presents greater teaching possibilities than many lines of instruction. The development of the subject, its training value, and methods of presentation are included as a part of the intruction.

1. House Sanitation.
   Location, site, drainage, water supply
   Heating, lighting, ventilation
2. Finishes and Furnishings.
   Floors, floor finishes, floor coverings
   Walls, wall finishes and coverings
   Windows, shades, draperies
   Suitable furnishings for various rooms in the home under various conditions
   Advantages and disadvantages of kinds and quality of finishes and furnishings with regard to sanitation and economy and necessary care of same.
3. Household organization.
   Necessity of system in the household
   Division of labor, daily and weekly schedule
   Discussion of household service problems, an attempt to answer these questions:—
   Who shall do the work? When, where, and how shall it be done?
4. Household Expenditures.
   Need of business management in the home
   Classification of expenditures, division of income
   Methods of purchase, keeping of accounts, paying of bills
   Discoveries of leakage in household expenditures
5. Pedagogical Problems.
   In connection with each subject attention is given to the practical application of the above problems, not only for the home, but also as to the best methods of presenting the work to public school classes.

ENGLISH

English as given in connection with the Home Economics courses is designed to aid the student to overcome bad habits of speech and writing. Oral topics relating to the special subject form the nucleus of the recitation work. For written work, daily paragraph themes illustrating various methods of presentation and exposition are required for the larger part of the course, outlines for all oral topics are prepared, and at least one long theme is written. In the paragraph theme attention is paid to matters of punctuation and correctness of idioms rather than to grace of style.

PHYSICAL TRAINING

Opportunity is offered to students for physical training in regular classes in the gymnasium and natatorium.

ELECTIVES

In the selection of electives student adsvise with and secure approval of the director of the department.

SCHEDULE OF HOME ECONOMICS CLASSES

JUNIOR YEAR	SENIOR YEAR
Psychology and Pedagogy	Organization of Home Economics
English	Observation and Practice Teaching
Food Study	Dietetics
Elementary Cookery	Advanced Cookery
Physiology and Hygiene	Household Management
Home Nursing	Dressmaking
Model Sewing	Textiles
Plain Sewing	Art Needlework
General Chemistry	Millinery
Food Chemistry	Microbiology
Mechanical Drawing	Chemistry of Nutrition
Drawing and Design	
Physical Training	Interior Decoration and Furnishing*
	Primary Handwork*
	Home and Social Economics*
	Trade Dressmaking*
	Physical Training*

*Optional Senior Courses

THE HOMEMAKERS SCHOOL

GENERAL STATEMENT

This school is a department of The Stout Institute maintained for the purpose of preparing young women, who do not wish to teach, for the responsibilities of the homemaker.

The school has been in existence seven years. The character of the work done by the students who have completed the course, their estimate of its value, and the favorable judgment expressed by scores of intelligent men and women from all parts of the country, who have visited the school, studied its plan of organization, and observed its work, all combine to approve the action of its founders in organizing the school.

No attempt has been made to secure a large attendance, because of the rapid growth of the other departments of the institute and the consequent limited accommodations available for the homemakers' school.

It is hoped that in the near future the new buildings to be provided will make it possible to remove the limit on attendance.

A bulletin giving detailed information concerning the courses offered in this school will be sent upon application.

TRADES SCHOOL

PLUMBING AND BRICKLAYING TRADES

This school is organized to meet the demand for men in the trades who possess the necessary technical knowledge, and skill in applying that knowledge through modern methods in construction work. Young men are able to secure this theoretical and practical training under competent instructors in much less time than under the apprenticeship system. Even when the apprenticeship conditions are most favorable, but little knowledge of the fundamental principles underlying the correct trade processes are ever acquired by the apprentice. With the instruction and practical training given in this school, its graduates are able to command good wages at once, and to become skilled workmen within a short time after completing their course of instruction in the school. It is not claimed that the completion of either of the courses in the school will entirely take the place of practical experience in the trade, so necessary for the skilled mechanic, but that these courses of instruction, when mastered, materially shorten the time required for a full mastery of the trade, and give a much better knowledge of the principles which determine the best trade processes and practice than can be obtained in any other way.

The kind of training which this school gives not only fits men to follow directions intelligently and skillfully, but to plan and lay out work, to estimate materials and cost, and to give directions to others,—important matters for those who would become foremen, superintendents, or contractors. The demand for skilled men in these two trades is steadily increasing and insures ready employment at good wages for those who complete either of the

courses, and rapid advancement when the school training has been supplemented by a reasonable amount of experience.

The work in each department is designed to meet the needs of the man who has already done some work in the trade as a workman, but who wants to strengthen and broaden his preparation through systematic instruction and training adapted to his special needs. It is also designed to meet the needs of the man who has no knowledge of the trade processes or of the principles underlying them and who wishes to take the necessary steps to become a skilled workman with capacity for leadership, in the shortest possible time.

A special circular of information gives details of these courses. A copy will be sent upon request.

FURTHER INFORMATION

Inquiries regarding the purpose and character of work offered at The Stout Institute, the regular courses of study or those of the summer session, the Bulletin and other publications of the school; or inquiries regarding the qualifications of Stout graduates for the teaching of special subjects, should be addressed to

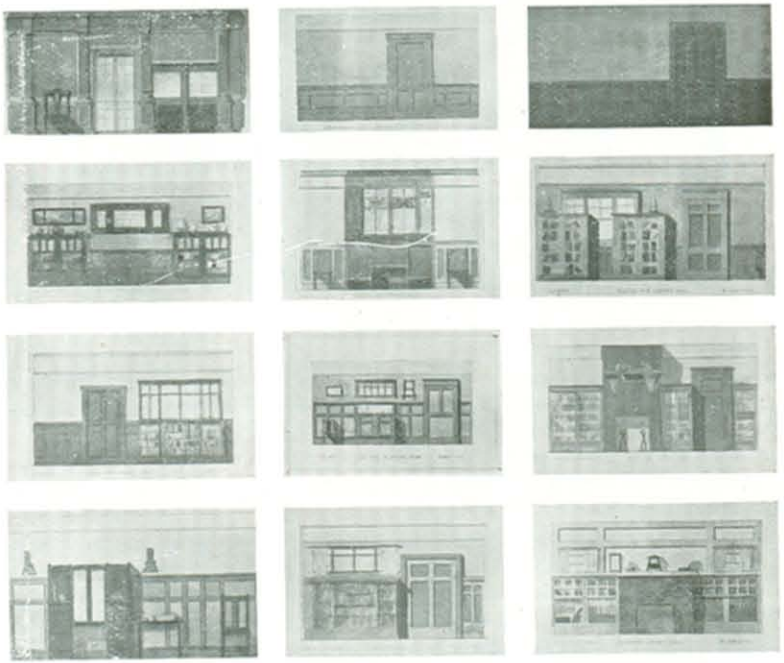
L. D. HARVEY,
President The Stout Institute,
Menomonie, Wisconsin.

THE SUMMER SESSION OF 1913

EIGHTH ANNUAL SUMMER SESSION OF THE STOUT INSTIUTE, HELD AT MENOMONIE, WISCONSIN, AUGUST, 1913

The eighth annual summer session of the Stout Institute which opened July 28th and closed on August 29th, was the most successful in the history of the school. 68 courses of study were offered, covering a considerable variety of the Manual and Household Arts as taught in the public schools and in various industrial schools. Many in attendance had been in Menomonie for previous summer sessions, and their return from year to year indicates that they have found in the work of the Stout Institute, instruction which has met their needs in their own school work.

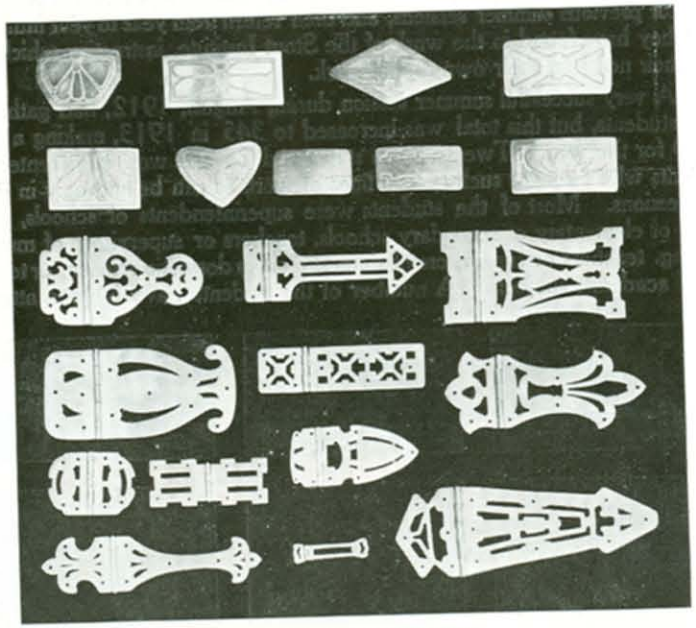
A very successful summer session during August, 1912, had gathered 285 students, but this total was increased to 345 in 1913, making a gain of 60 for the year. Twenty-seven states and Canada were represented by students who came for such special lines of work as can be had only in summer sessions. Most of the students were superintendents of schools, principals of elementary or secondary schools, teachers or supervisors of manual training, teachers or supervisors of domestic art or domestic science, or teachers of academic subjects. A number of the students have been in attend-



PROBLEMS FROM SUMMER CLASS IN INTERIOR DECORATION

ance during the past year at the Stout Institute or at other schools, and were here to continue their studies. Several students were here because of the work offered in the art crafts, and wished the work for their own use and not for teaching.

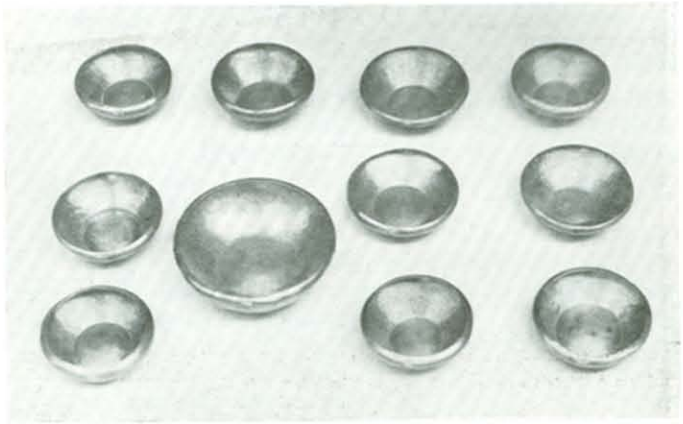
Each year increasing demands for new courses have appeared, and the school has endeavored to meet this demand by offering such courses as seem to be called for in connection with public school work in the industrial subjects. Eight years ago the summer school offered 17 courses. Courses have been carefully revised and new courses added year by year to give the work which has appeared to be most vital in the schools. The faculty has been increased to keep pace with the growth of the school from 6 officers and teachers in 1906 to 40 in 1913. During this time, the number



HAMMERED METAL PROBLEMS

of students in attendance has increased from 21 to 345. The number of men enrolled has increased from 10 in 1906 to 164 in 1913, and the number of women from 11 in 1906 to 181 in 1913. Two hundred of the enrollment of the last summer session selected courses in manual arts, and a hundred seventy-one in the household arts, while twenty-six of these combined work in the two departments.

The maturity of the students has been noted from year to year, and it was evident during the 1913 session that a large part of the enrollment of the school included men and women of experience who knew what they wanted and who intended to profit by their summer study. By far the largest group of students ranged in age from 20 to 30 years, a few being under 20 and a large number over 30.



HAMMERED COPPER BOWLS

The following courses were offered, and included forty-six in the manual arts and twenty-two in the household arts.

MANUAL ARTS COURSES

THREE GENERAL COURSES

Organization of Manual Training
Industrial Economics
Shop courses and Equipment

ELEVEN DRAWING COURSES

Elementary Drafting
Professional Drawing
Machine Sketching
Machine Drafting
Architectural Sketching
Architectural Drafting
Architectural Details
Interior Decoration
Pencil Sketching
Elementary Design
Furniture Design

TEN METAL WORK COURSES

Professional Forging
Elementary Forging
Agricultural Forging
Tool Smithing
Art Smithing
Jewelry and Silver Work
Hammered Copper Work
Machine Shop Practice
Foundry Practice
Millwrighting

TWELVE COURSES IN WOOD-WORKING

Mill Work
Elementary Carpentry
Carpentry Construction
Joinery
Wood Turning
Elementary Cabinet Making
Case Construction
Wood Finishing
Varnishing and Polishing
Elementary Pattern Making
Advanced Pattern Making
Elementary Woodwork

TEN OTHER MANUAL ARTS COURSES

Primary Handwork
Clay Modeling
Pottery Making
Elementary Printing
Advanced Printing
Cement Work
Bricklaying
Plumbing Practice
Plumbing Theory
Photography

HOUSEHOLD ARTS COURSES

THREE GENERAL COURSES

Organization of Domestic Economy
Household Management
Home Nursing

EIGHT DOMESTIC ART COURSES

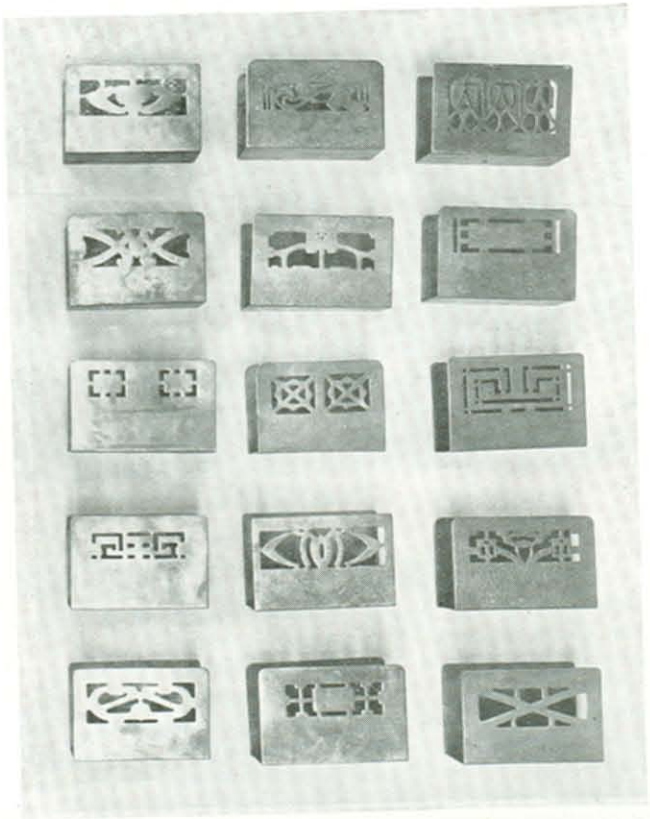
Plain Sewing
Model Sewing
Art Needle Work
Millinery
Dressmaking
Cutting and Fitting
Textiles
Costume Design

SIX FOODS AND COOKERY COURSES

Food Study I
Food Study II
Elementary Cooking I
Elementary Cooking II
Advanced Cooking
Dietetics

FIVE SCIENCE COURSES

General Chemistry
Food Chemistry
Chemistry of Nutrition
Household Chemistry
Microbiology



PIERCED COPPER BOOK HOLDERS

Several of the courses were given for the first time this year.

A course of lectures on Industrial Economics, was concerned with the practical application of problems of economics to the industrial problems of the day, emphasis being placed upon a study of industrial conditions which are creating the demand for vocational training in the schools.

IRON LANTERNS

Lectures on Shop Courses and Equipment were also featured for the first time, and covered the subject matter of manual training courses and details of equipment and maintenance.

A course in Machine Sketching consisted entirely in the making of free hand sketches of machine parts as a foundation for the more difficult work in machine drafting.

A course in Architectural Details emphasized problems in building construction fundamental for the teaching of architectural drawing.

A course in Furniture Design was offered to enable students to solve problems which appear in connection with furniture construction.

A course in Professional Forging covered practical work, methods of teaching, planning of forging courses, equipment, and a study of iron and steel.

A course in Agricultural Forging was given for teachers in agricultural colleges, teachers of agricultural work in public schools and in county agricultural schools.

A course in Mill Wrighting furnished help for teachers of wood working who are expected to install and take care of their wood working machinery.

A course in Mill Work included the care and use of wood working machincry, and the getting out and assembling of stock for general wood work.

A course in Elementary Carpentry was planned to teach the fundamental tool processes of carpentry and elements of frame building construction.

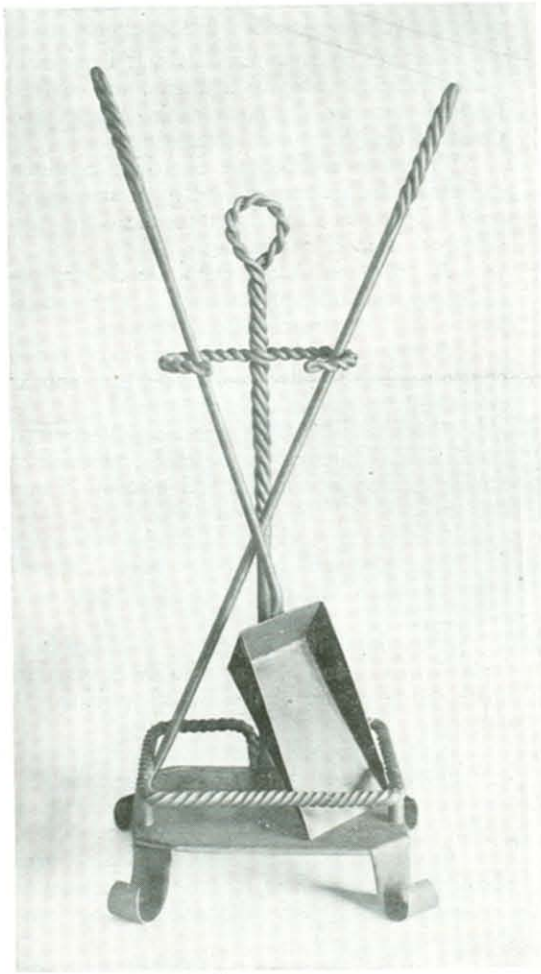
A course in Joinery was offered for teachers of high school work who feel the need of definitely sequenced exercises in woodwork.

A course in Case Construction included the making of a piece of cabinet work and afforded an opportunity for the use of wood working machinery in connection with bench work.

A course in Varnishing and Polishing gave students who had had work in wood finishing an opportunity for advanced work in the making of rubbed finishes.

Advanced Pattern Making involved more difficult planning and more intricate constructions than that covered in the elementary course.

Cutting and Fitting included drafting, patternmaking, fitting and draping, and was offered to meet the needs of teachers of dressmaking classes in high schools. continuation schools, and trade schools.



WROUGHT IRON FIRE SET

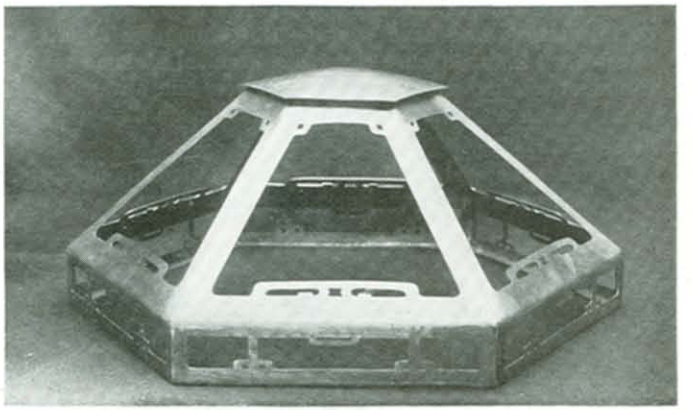
Costume design aimed to teach the designing and sketching of costumes, and was offered especially for students taking the course in cutting and fitting.

A course in Household Chemistry was featured to teach the chemistry of processes which may be applied in the teaching of cooking, textile work, or cleaning, and was planned for the special teacher as well as for the householder.

In addition to the members of the regular faculty of the Stout Institute, five special teachers from other institutions were engaged to teach summer courses,and their work was much appreciated by students of the summer session.

Mr. Maurice I. Flagg, Director of the State Art Commission of Minnesota, and special lecturer on Design, Handicraft, and Normal Art at the Minneapolis Handicraft Guild, taught the courses in Elementary Design, Furniture Design, and Interior Decoration.

Mr. Harold T. Boyle, a skilled craftsman and teacher of metal work, taught the classes in Jewelry and Silver Work and in Hammered Copper work.

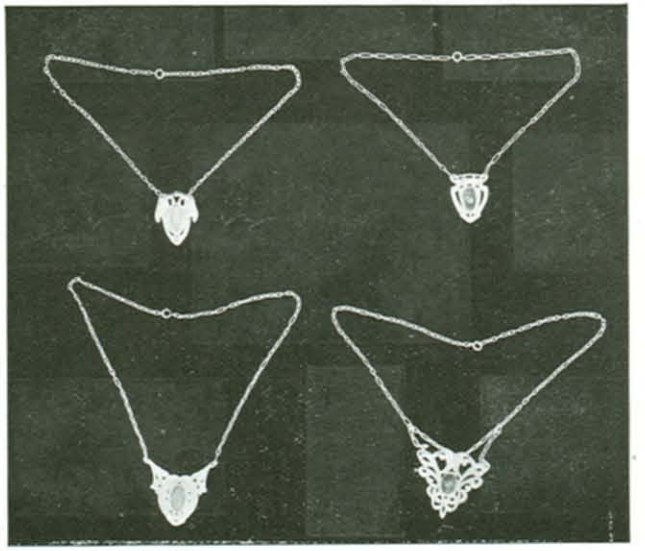


COPPER LAMP SHADE

Prof. Edward J. Lake, of the department of Art in tne University of Illinois, taught the Architectural Drafting, Architectural Sketching, and Architectural Details.

Mr. Thomas F. Googerty, teacher of forging in the Illinois State Reformatory at Pontiac, taught the Elementary Forging, Art Smithing and Agricultural Forging.

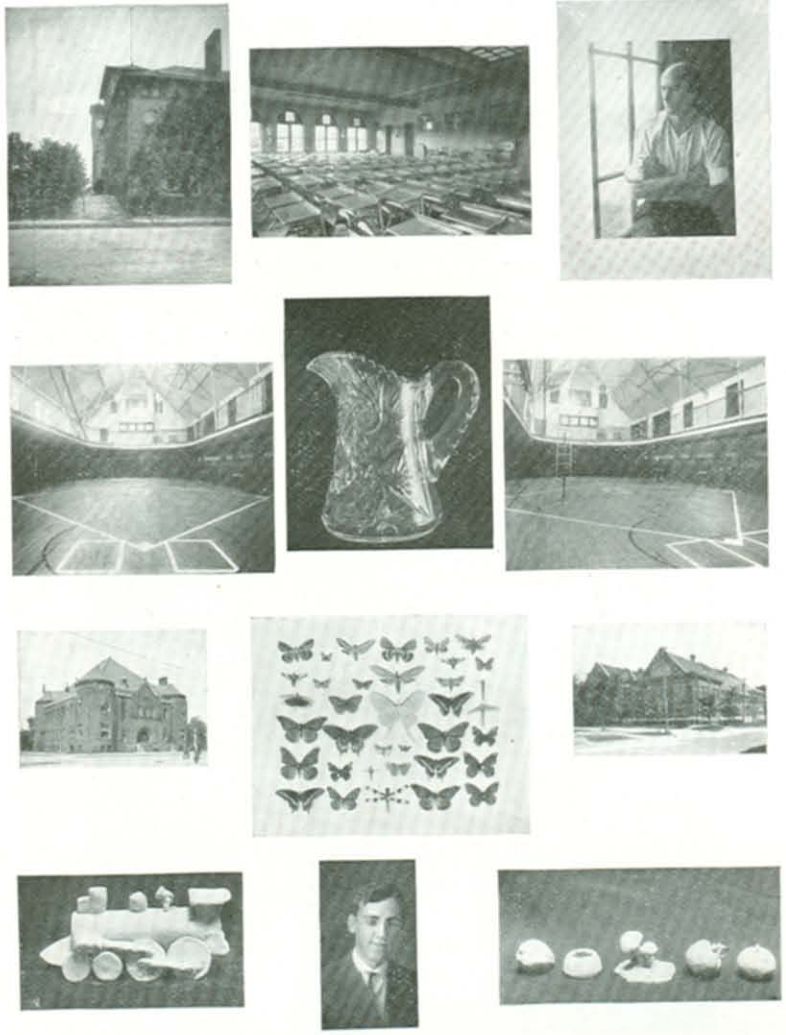
Mr. Paul H. Graven, Director of Manual Training in the public schools at Madison, Wis., taught the Elementary Drafting.



JEWELERY AND SILVER WORK

The outing advantages of Menomonie make a larger and larger appeal every year to teachers who have worked hard during the regular school year. Menomonie is an attractive city, with beautiful surroundings of lake and river and drives, and many students every year take advantage of combining a cool summer outing in Northern Wisconsin with the opportunity for special instruction in the school arts.

The city offers unusual attractions to summer students and visitors in the way of outdoor enjoyment. Boating on Lake Menomin, on the Red



PROBLEMS IN PHOTOGRAPHY COURSE

Cedar river and on Wilson Creek was enjoyed by most of the students at some time during the summer session. Canoes, rowboats and launches were available for general use at reasonable rates and many of the students had learned to take advantage of the picnicking along the banks. The tennis court was popular during the summer session, and added greatly to the enjoyment of the work of many of the men and women in attendance. A number of students rented tents and enjoyed camp life between studies. Hiking in all directions from Menomonie was popular with students who had no other means of getting about, as well as with those who preferred walking to riding.

ALONG THE RED CEDAR RIVER

It is proposed for the summer session of 1914 to offer substantially the same courses as were offered during the season of 1913, with such additions as the experience of 1913 seems to suggest as desirable. An attempt will be made to meet in the best possible way a demand for courses of a vocational character, and it is hoped that the summer session of 1914 will prove more profitable to students than any that have proceeded it.

NEW BUILDING TRADES SCHOOL

The new $50,000.00 building for the teaching of the building trades will add greatly to the facilities for this work. The school has been greatly cramped for several years in the matter of adequate room for certain lines of instruction and to meet this condition is now erecting a building eighty-four by a hundred seventy-five feet for the teaching of architectural and trade drafting, carpentry, mill work, joinery and cabinet making, wood finishing, plumbing and heating, and bricklaying and cement work.

An attempt has been made to meet in a school building the practical demands of the trades and to have shops of such a character as will furnish proper environment for this work. A few of the special features of the plan may be indicated:

The drafting rooms have side lights and skylights and provision for daylight and electric blue-printing.

The carpentry shop, thirty-six by eighty feet, is over twenty feet high, with a removable wall twenty by twenty-seven feet. Balconies for handling lumber and for class work are arranged at each end of the shop.

A Morton moist air dry kiln and a large room filled with lumber racks make provision for the adequate handling of both unseasoned and seasoned woods.

A mill room well supplied with woodworking machinery is connected with the carpentry shop on one side and with the joinery shop on the other. Machines are driven by individual motors. The shop is lighted from each end and by means of a skylight over the center.

The joinery shop is in the center of the building on the first floor and is connected with a lift to the finishing room directly over it for carrying products to that room. An assembling room at the rear takes care of gluing, assembling, and storing partially finished construction.

The finishing room, varnishing room, and store room make provision for staining, shellacking, varnishing, and painting under proper shop conditions and with first class lighting and ventilating arrangements.

A shop extending through two stories to the roof takes care of the plumbing and heating. It is provided with work balcony and lecture balcony and skeleton house frames for the installation of fixtures. A large floor gives every facility for the various details covered in soldering, joint wiping, iron pipe work, soil pipe work, and erecting.

Brick laying and cement work are provided for in a large shop similar to the plumbing shop and lighted on three sides.

CALENDAR FOR 1914-1915

Ninth Annual Summer Session begins July 27, 1914

Summer Session ends August 28, 1914

Twelfth Regular Session begins September 7, 1914

Holiday vacation---December 19, 1914-January 3, 1915

First semester ends January 22, 1915

Second semester begins January 25, 1914

Spring vacation---March 27, 1915-April 4, 1915

Twelfth Regular Session ends June 4, 1915